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CASE RECORDS IN OPHTHALMOLOGICAL CLINICS
CONRAD BERENS, Jr., AND GERTRUDE E. STURGES

(Complete contents inside)

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ARCHIVES OF OPHTHALMOLOGY.

PRIMARY GLIOMAS OF THE CHIASM AND OPTIC NERVES IN THEIR INTRACRANIAL PORTION.[1]

BY DR. PAUL MARTIN (BRUSSELS) and DR. HARVEY CUSHING (BOSTON).

(With forty-two illustrations on Text-Plates VIII.–XXVI.)

THIS paper is concerned with the report of seven tumors, all of them gliomas which appear to have originated either in the chiasm or the optic nerves adjacent to it. In only one instance (Case VII), and then because of a coexistent disorder, was the probable source of origin and character of the lesion surmised before the actual condition was brought to light. Though a correct localizing diagnosis of a suprasellar lesion had been made in all but two of the patients (Cases I and V), a tumor of hypophysial or pharyngeal-pouch origin was looked for with secondary involvement of the chiasm through pressure.

Ophthalmic surgeons have long been familiar with the gliomas originating, or appearing to originate, from the optic nerves in their intraorbital portion, and the tradition prevails

[1] The basis of a clinical demonstration before the New England Ophthalmological Society held at the Peter Bent Brigham Hospital, November 20, 1922. Among the patients showing primary optic atrophy were two that had recently been operated upon—Case VII of the present series with a verified chiasmal glioma, and another a child with a verified tumor of the craniopharyngeal pouch. It was agreed that the ophthalmoscopic appearance of the atrophic nerves in the two patients was undistinguishable.

that these tumors are not particularly malignant or at least of very slow growth, and do not tend to recur in the orbit after removal.

The literature of the subject is extensive and in our present connection stress will be laid on only two points which become evident from its perusal—(1) the confusion in terminology and, (2) the frequent involvement in the growth of the intracranial portions of the nerves and the chiasm. Thus in the earliest recorded example, a neuroma nervi optici reported by Hegmann in 1842, the tumor extended to the chiasm. The first case in which an intraorbital enucleation was attempted (that of Ritterich in 1861 for a "sarcoma" of the nerve) resulted in a fatality, and at autopsy an enormous enlargement of the chiasm was found. Likewise among other early cases surgically treated were three reported by von Graefe,[1] a sarcoma myxomatodes (1864), a myxoma (1864) and a glioma (1866). The last of these reports concerned a child aged six with exophthalmos due to tumor of the nerve which led to operative removal of the globe and partial extirpation of a retrobulbar tumor. Meningitis followed, and the autopsy revealed what was termed by Virchow a "glio-sarcoma" involving the intracranial portion of both optic nerves, chiasm and base of brain.

These early disclosures do not appear to have greatly impressed those who have subsequently written upon the subject, for the literature is almost wholly confined to the description of cases characterized by an extensive intraorbital tumefaction with its accompanying exophthalmos. Moreover, there has been such confusion regarding the histogenesis of these lesions taken as a whole, that many writers have made no serious attempt to distinguish the true tumors of the nerve from those which arise from its meningeal sheath—for the most part endotheliomas or meningiomas[2] as we prefer to call them.

One of the better known of the early articles on the subject

[1] Graefe. "Zur Casuistik der Tumoren." *Arch. f. Ophth.*, 1864, x., 1., 193 and 201. *Ibid.*, 1866, xii., 2, 100.

[2] Cushing H. "The Meningiomas (Dural Endotheliomas). Their Source and Favored Seats of Origin." *Brain* (London), 1922, xlv., 282–316.

is that by Leber's pupil Willemer,[1] who in 1879 assembled from the literature the reports of twenty-five cases of most variable histology, though many of them doubtless represented true gliomas of the nerve. To these he added the histories of two cases from Leber's clinic, one of which relates an experience similar to that which had befallen von Graefe's patient mentioned above, namely meningitis following an intraorbital enucleation of what was termed a myxosarcoma of the nerve. Here again the autopsy showed an unsuspected intracranial extension of the growth which not only involved the chiasm but the other optic nerve as well.

At that day there was such a degree of hair-splitting in matters of histopathological nomenclature that many lesions of unquestionably the same histogenesis were given a variety of qualifying designations, and there can be little doubt that some (Verhoeff thinks the majority) of these so-called myxosarcomas were of the same nature as the tumors we have under consideration. In its gross appearance, at all events, the chiasmal tumor which Willemer pictures (*loc. cit.* Table VI, Fig. 12) bears unmistakably a close resemblance to the chiasmal gliomas we have encountered.

From Willemer's time we may pass without reference to the many intervening publications, to another notable study of the subject, with the analysis and assemblage of all previously recorded cases, made in 1912 by Arthur C. Hudson,[2] then curator of the Royal Ophthalmic Hospital. Like other ophthalmic surgeons, Hudson approached the subject from the standpoint of the intraorbital tumors and included in his discussion those arising from the sheath as well as those of the nerve proper. However, he considerably simplified their classification by dividing them into three groups—tumors showing gliomatosis, fibromatosis, and those of endothelial origin. The two latter groups, representing tumors which arise from the nerve sheath or its meningeal envelopes do not here concern us, but of the former, those exhibiting glial

[1] Willemer, W. "Ueber eingentliche d. h. sich innerhalb der äusseren Scheide entwickelnde Tumoren des Sehnerven." *Arch. f. Ophth.*, 1879, xxv., 161–247.

[2] Hudson, A. C. "Primary Tumors of the Optic Nerve." *Royal London Ophthalmic Hosp. Rep.*, 1912, xviii., Part III, 317–439.

proliferation, Hudson assembled and tabulated 118 cases, the larger number of which had been originally described as myxosarcomas of one form or another.

What is of major interest to our present topic is the fact brought out in the author's tabulation that in all but one of the eleven cases in which there was a postoperative fatality with subsequent autopsy, an extensive intracranial involvement of nerves and chiasm, often with more or less invasion of the brain, was the invariable post-mortem finding. Moreover, it is evident that in fourteen other instances, symptomatic evidence of intracranial disease had already appeared by the time the cases were reported.

Though Hudson was well aware of the fact that the tumor need not be confined to the orbital position of the nerve but may extend into the cranial cavity, his tabulation of these 118 cases nevertheless makes it clear that after the removal of the intraorbital lesion local recurrence is surprisingly rare and patients may remain free from symptoms for many years. Hence, granting accuracy of diagnosis, it is evident either that certain of these gliomas may take their origin in and remain confined to the intraorbital portion of the nerve, or else that the lesion may be so slow in its growth as to allow a long lease of life. In view of this one is forced to consider the possibility that there may be gliomas of different types—relatively malignant and relatively non-malignant varieties of what Hudson terms gliomatosis, for he hesitates to use the designation glioma. And in this connection it is necessary to mention that the neurofibromatosis of von Recklinghausen, a comparatively benign process, may have been the underlying factor in some—perhaps in many—of the recorded cases with a particularly favorable surgical outcome.

The possible relation of these tumors to generalized neurofibromatosis has engaged the attention of several who have written on the subject and has led to considerable controversy. One of the chief proponents of this view was Emanual,[1] who in 1902 laid particular stress on this association.

It is well known that multiple cranial-nerve tumors may

[1] Emanual, C. "Ueber die Beziehungen der Sehnervengeschwülste zur Elephantiasis neuromatodes und über Sehnervengliome." *Arch. f. Ophth.*, 1902, liii., 129–161.

accompany outspoken examples of von Recklinghausen's disease, but of all the nerves the optic are perhaps the least often involved in the process. The acoustic nerves, on the other hand, are far more commonly affected—indeed are usually affected singly and oftentimes in the absence of any other recognizable manifestation of neurofibromatosis elsewhere in the body. These tumors, however, are of such distinctive pathology they can hardly be confused with any other variety of neoplasm. Emphasis is laid upon this because in Case VII of our present series, though the patient evidently was a victim of generalized neurofibromatosis of mild degree, the chiasmal tumor was rich in glia fibrils. These are wanting in the true acoustic "neurinoma" which possesses, in other respects also, an unmistakable histological architecture.

By far the most important contribution to the subject from our present standpoint has recently been made by F. H. Verhoeff.[1] He has given a detailed study of eleven examples of what he calls primary intraneural tumors of the optic nerve, all of them, however, with the possible exception of De Schweinitz's case having been tumors supposedly restricted to the intraorbital portion of the nerve. Though he mentions that an intracranial extension of these tumors is possible, he states that "recurrence after incomplete removal of the orbital tumor has never been recorded." Verhoeff's chief attention was paid to the histopathology of the lesions, and while emphasizing their extreme rarity he stresses the fact that the primary intraneural tumors of the nerve reported as myxomas, myxogliomas, or myxosarcomas by his predecessors in the earlier literature, have probably all been gliomas.

It is natural enough that the ophthalmic surgeon should have been chiefly concerned with tumors which have originated in or have come to involve the optic nerve in its orbital portion with the usual concomitant of an exophthalmos. On the other hand, neuro-surgeons, owing largely to their intracranial pursuit of hypophysial tumors, have of late years come

[1] Verhoeff, F. H. "Primary Intraneural Tumors (Gliomas) of the Optic Nerve." *Arch. f. Ophth.*, 1922, li., 120–40; 239–54. Dr. Verhoeff's paper richly deserved the Knapp prize which was awarded for it, and it may be recalled that Herman Knapp in 1879 reported one of the early cases of glioma of the optic nerve.

frequently to expose the region of the chiasm in their operative procedures, and reports of their experiences have begun to appear in the literature.

In neurological parlance, tumors in this region are generally referred to as suprasellar or as interpeduncular tumors. Having a characteristic symptomatology they are, generally speaking, easily recognized; but on the whole we stand in relation to them in much the same position that a few years ago we stood in relation to the tumors occupying the cerebellopontile angle. Neurologists for the most part were satisfied to localize a lesion in the lateral recess and rarely ventured before operation to foretell its pathological nature. Happily, we do much better than this today. And in like fashion, now that the localizing symptomatology of the suprasellar lesions is well understood, it behooves us to take a forward step and, so far as possible, to anticipate before operating, the morbid nature of the process.

Primary optic atrophy, visual-field distortions, deviations from the normal in the profile configuration of the sella, suprasellar shadows, oculomotor palsies, diabetes insipidus, somnolence, and so on, as well as the constitutional evidences of secondary pituitary involvement, constitute, when taken together, a symptom-complex pointing unmistakably to the suprasellar region. But given a primary optic atrophy, often with accompanying temporal-field defects as the essential basis of the localizing diagnosis, we have reached the stage at which it is possible with some exactitude to differentiate a few at least of the many tumors which may occur in this neighborhood, perhaps the most common site of intracranial-neoplasms.

There are various ways of exposing the suprasellar region, the anterior rather than the lateral route being very much favored in this clinic. It, however, is not our purpose to discuss the relative merit of these two routes for operative methods naturally vary in different hands. It may suffice to say that the mortality for these osteoplastic procedures is very low,[1] and that in the majority of cases an excellent view of the region from directly in front and without damage to

[1] In the Brigham Hospital series there have been at this writing (December 8, 1922) 84 transfrontal operations on 72 patients, with six post-operative fatalities, two of them having occurred in this small glioma series.

the brain can be secured. Whatever may be the favored method of approach, the chief difficulties are two—(1) in dealing effectively and permanently with a surgically removable lesion if it has reached a large size before its exposure, and (2) in the differentiation from the others of the pathologically inoperable lesions of the neighborhood like those under immediate consideration—the chiasmal gliomas.

Gliomas which originate elsewhere than in the chiasm are, to be sure, not uncommon in this neighborhood—those from the perforated space, the floor of the third ventricle, the infundibulum, or even the posterior lobe of the hypophysis; but these tumors in our experience do not tend to invade the chiasm; are more likely in the course of their development to produce a choked disk than a primary atrophy; and, though a number of these cases are recorded in our tumor series, they have been excluded as irrevelant to this particular study.

What may be the general run of the suprasellar tumors encountered in the course of neurosurgical operations can be gathered by an article of two years ago by George J. Heuer, who reported[1] a series of twenty-eight surgically verified "chiasmal lesions" of which twenty were hypophysial adenomas, three were craniopharyngeal duct tumors, four were said to be gliomas of the perforated space or base of the brain, and one a sarcoma arising from the optic nerve sheath. None of the cases in his series, therefore, would appear to have been of the type under consideration, but in answer to a letter of inquiry Dr. Heuer writes that one of the cases, classified as a "glioma of the base of the brain," was unquestionably a primary chiasmal tumor. The patient, aged twenty-one, had a progressive loss of vision for several years and on admission was blind in the left eye and showed an imperfect temporal hemianopsia in the other. A diagnosis of suprasellar tumor was made but at operation a tumefied chiasm was disclosed. On the left side a pedunculated nodule of tumor had broken through the outer bundles of fibres. This was removed for study and pronounced a glio-fibro-

The others resulted from consecutive efforts to deal successfully with large calcareous tumors originating from Rathke's pouch.

[1] Heuer, G. J. "Surgical Experiences with an Intracranial Approach to Chiasmal Lesions." *Arch. Surg.*, 1920, i., 368–81.

sarcoma by the pathologist, though Dr. Heuer regarded it as a glioma. The patient survived for four years. The case is of interest in showing how these tumefactions which appear for a long time to be restricted to the nerves or chiasm may ultimately extend beyond these confines.

In 1921 W. L. Lillie of the Mayo Clinic recorded, chiefly from the ophthalmological point of view, a series of six suprasellar tumors.[1] His second case may possibly represent one of these chiasmal gliomas, but the description is not given in sufficient detail to make this certain, though a glioma into which the optic nerve disappeared was disclosed by A. W. Adson at operation.

More recently W. E. Dandy[2] has called attention to the fact we also desire to emphasize, namely that a large number of intraorbital optic-nerve tumors will be found to involve the intracranial structures. However, the two cases he reports are both examples of the more common endotheliomas of the nerve sheath, and we feel that he is over-enthusiastic regarding the operability of the gliomas which are evidently included in his subsequent generalizations regarding these lesions which he terms "prechiasmal."[3]

In order to gain some idea of the prevalence of these chiasmal gliomas some figures may be given from the records of the Brigham Hospital clinic. At the time of this writing the series contains 826 histologically verified intracranial tumors of which 345 are gliomas of various types and regions, representing therefore 41.7 per cent. of intracranial tumors taken as a whole. The seven chiasmal tumors included in this report consequently represent only two per cent. of all the 345 gliomas and only 0.84 per cent. of all verified tumors[4].

[1] Lillie, W. L. "Ocular Phenomena of Chiasmal Lesions Not of Pituitary Origin. Report of Six Cases." *Surg. Clinics of N. America*, 1921, i., 1363.

[2] Dandy, W. E. "Prechiasmal Intracranial Tumors of the Optic Nerves." *Am. J. Ophth.*, 1922, v., 169–188.

[3] Certainly the gliomatous tumors which appear to originate in the chiasm have not as yet been observed or recognized by neuro-surgeons, if one may judge from the replies to letters of inquiry which have kindly been sent us.

[4] Two other possible examples have not been included in this paper because the pathological material is not available for reinvestigation in our

For convenience of regional rather than pathological study a separate classification of our tumor cases is kept up to date. This includes a series of 233 verified tumors arising from or near the hypophysis and which have affected the chiasm by direct pressure. These may be tabulated as follows:

Hypophysial adenomas of all types	164
Cranio-pharyngeal pouch tumors	38
Endotheliomas	13
Interpeduncular gliomas	13
Teratomas	3
Epidermoid cholesteatomas	2

In this regional tabulation the suprasellar as well as the intrasellar lesions have been incorporated and among the thirteen interpeduncular gliomas the seven chiasmal tumors were included. They thus represent on this regional basis slightly less than three per cent. of all the tumors found in the hypophysial neighborhood which are likely to affect the chiasm by pressure and cause primary optic atrophy.[1]

By far the larger number of the 233 verified lesions included in this hypophysial and parahypophysial group have been intrasellar hypophysial adenomas with a greatly enlarged pituitary fossa. In this clinic these cases have for the most part been operated upon by a transphenoidal procedure, which of course does not expose the chiasm. However, in seventy-two cases a transfrontal operation has been performed for lesions obviously suprasellar in their situation, and the region of the chiasm brought into view. In eleven of these cases the nature of the lesion was not identified. In the sixty-one cases which were histologically verified the conditions tabulated below have been encountered.

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present connection. One of them was autopsied elsewhere, and in the other case the coronal brain-slab comprising the tumor, after sections showing glioma were taken, has been mislaid. In all probability, however, judging from the photographs both are also chiasmal tumors, but they have been excluded on the grounds of an imperfect topographical description, for the lesion may possibly have originated in the third ventricle and spread into the chiasm.

[1] Thus in the series of Heuer and Dandy (*loc. cit.*), in which an intracranial operation was done for all tumors of the region, including the primarily intrasellar adenomas, one presumable chiasmal glioma was identified in 28 cases; = 3.5 per cent.

		Cases
1.	Tumors of craniopharyngeal pouch	27
2.	Suprasellar endotheliomas	9
3.	Hypophysial adenomas	8
4.	Adenomatous cysts	5
5.	Chiasmal gliomas	5
6.	Arachnoiditis circumscripta	3
7.	Epidermal cholesteatomas	2
8.	Gliomas of IIIrd ventricle (?)	2
		61

This table would indicate that about eight per cent. of explorations of the suprasellar region for lesions provoking the usual local symptomatology would reveal chiasmal gliomas. If, however, we should include in this calculation the entire group of these suprasellar lesions recorded in the series, embracing the tumors which have been approached in other ways than by a transfrontal operation or which have been unexpected post-mortem findings, the percentage would fall much lower—indeed to approximately three per cent. if, as stated above, the adenomas are all included.

The five examples of chiasmal glioma included in the preceding table and the two others (Cases I and V) which were first disclosed at autopsy, will be presented chronologically in the order of their admission to the clinic.

CASE I.—P. B. B. H. Surg. No. 3951. *Pineal tumor "suspect": internal hydrocephalus: palliative operation. Death a year later. Autopsy: glioma of the optic chiasm.*

December 3, 1915.—Admission of John S., age 4½, referred by Dr. G. S. Derby of Boston, with complaint of loss of vision, polyuria and polydipsia.

Family history without interest except that the mother has a goiter.

Past History.—Early in life the child was treated for rickets presumably because of its prominent forehead. When he was one and one half years old he fell downstairs, hitting the top of his head; he vomited and was sick for three days. Since then there has been no vomiting nor headaches. His development was retarded and he did not walk until four years of age. He has been intellectually backward with slow development of speech, and even now he says only a few words and has a peculiar gibberish of his own. He has been taking thyroid extract during the

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Fig. 1. Case I. Child with low grade of hydrocephalus and blindness. Cause not recognized during life.

Fig. 2. Case I. Showing (as now interpreted) sella turcica (slightly tilted) with apparent extension under the anterior clinoids attributed to dilatation of optic foramina (O. F.).

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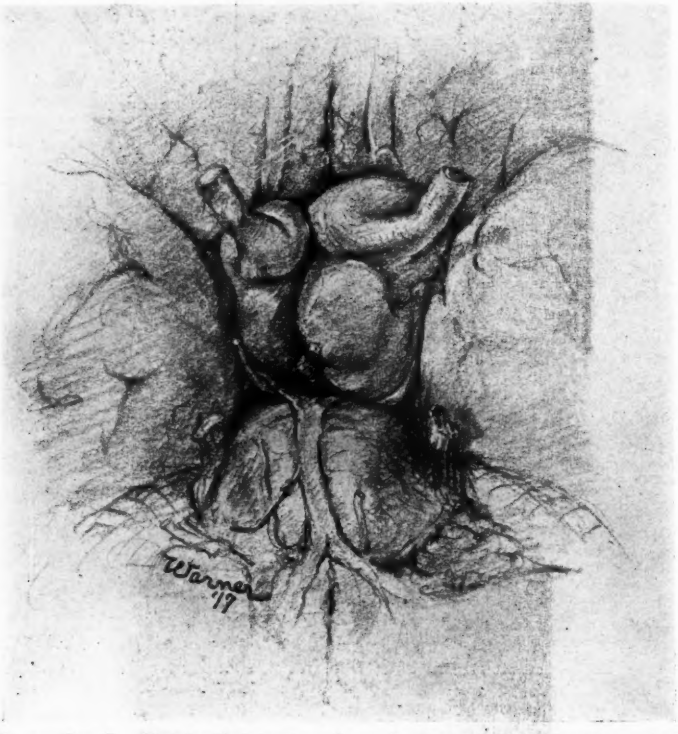

Fig. 3. Case I. Sketch of interpeduncular region (nat. size) showing the markedly enlarged chiasm and the coiled optic nerves. The stalk of the pituitary body is seen lying between the nates of the tumor.

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Fig. 4. Case I. Sagittal section of brain (nat. size) showing the tumor extending up in the region of the third ventricle. The right optic nerve thickened at its base is seen emerging from the tumor.

Fig. 22. Case IV. Photograph of patient on discharge, showing the well-healed scar of transfrontal operation.

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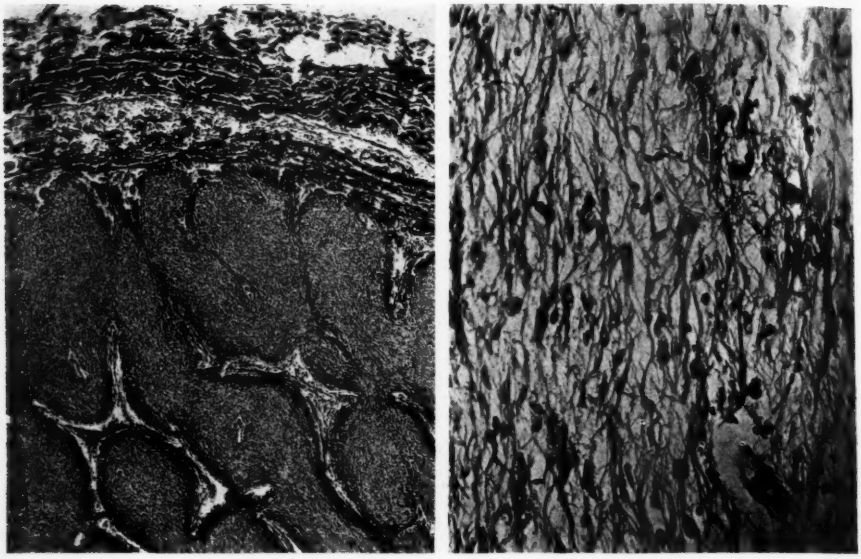

Fig. 5 (A and B). Case I. Section A (mag. x 80) across involved nerve showing extent of gliosis. Section B (mag. x 300) shows the characteristics of the chiasmal tumor: neuroglial cells and fibrils with cytoid bodies.

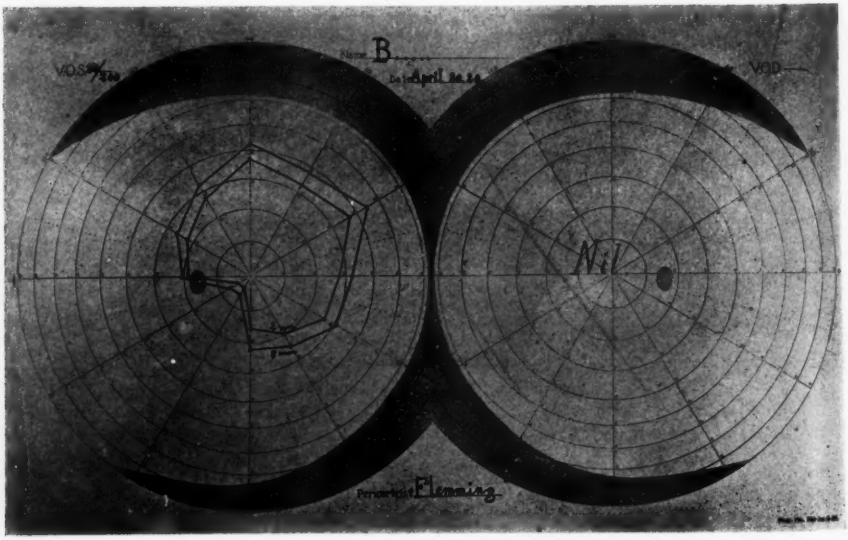

Fig. 6. Case II. Fields of vision showing to small disks a quadrantal defect on the left.

past year. Under this treatment his mentality and gait are said to have greatly improved.

Chronology of Symptoms.—Polydipsia for two or three years. Marked increase in vigor and stature for eighteen months. Loss of vision, change in disposition, polyphagia and polyuria for five months.

Positive Neurological Findings.—Child tall and strong for his age. Height: 117 cm. (normal 100). Weight: 27 kilos (normal 16). Head noticeably large (cf. photo, fig. 1). Bilateral optic atrophy regarded as secondary with near blindness. Perimetry impossible from lack of coöperation. X-ray of the cranium shows convolutional thinning suggesting hydrocephalus with no noticeable abnormality of the sella.[1] (Fig. 2).

A tentative diagnosis was made of possible pineal tumor, based largely on the boy's unusual stature. In view of the hydrocephalus a callosal puncture was performed on December 20, 1915, and he was discharged a month later.

Subsequent Note.—For ten months there was said to have been marked improvement in the child's mental condition, but this is only from hearsay. At the end of this period he began to refuse nourishment and died December 7, 1916. An autopsy was permitted.

Pathological Note.—The external aspect of the brain shows a large bulbous tumor mass filling the interpeduncular space, measuring about 3 x 3 cm. The growth appears to have originated in the chiasm, and out of it the thickened optic nerves coil in ram's horn fashion as shown in the accompanying sketch (Fig. 3).

A longitudinal mid-section discloses a moderate grade of internal hydrocephalus with no apparent cause. The pineal gland appears to be normal. The interpeduncular growth extends upward, crowding the third ventricle above it. (Fig. 4.) In the lower part of the tumor thus sectioned one can make out many of the transversely cut and widely separated fibers of the chiasm.

It would be difficult from this section to be certain whether the growth primarily arose in the chiasm and subsequently invaded the third ventricle, or the reverse, but the appearances greatly favor the former view. The stalk of the pituitary body was originally apparent (*cf.* Fig. 3), lying between the nates of tumor. This was lost on making the section.

Histological Note (Dr. S. B. Wolbach).—The tumor is

[1] The plate as at present reinterpreted, even though not a direct lateral view, shows, unmistakably, the enlarged optic foramina with overhanging anterior clinoids. Sphenoidal cells undeveloped.

composed almost entirely of neuroglia tissue, apparently traversed by bundles of myelinated nerves. The phosphotungstic-acid-hematoxylin stain shows fibrils to be very abundant and the cells mostly of the spindle cell type. Many of the cells show peculiar hyalin degeneration resulting in globoid masses of hyalin material and chains of globules. There are also rod-like hyalin bodies, evidently formed within cells, such as Verhoeff has described in gliomas of the orbit. From the homogeneous structure of the tissue, one must conclude that it is a glioma (Fig. 5B).

Cross sections of the optic nerves show that they have been almost entirely replaced by neuroglia. The general architecture is preserved (Fig. 5A) and the neuroglia at the periphery of the nerve bundles in most places possesses the usual arrangement of tangential and radial fibrils seen on the surface of normal nerve tissue. Here and there one can make out cross sections of myelinated nerves. There are occasional corpora amylacea in the tissue. There is some irregular extension of neuroglia into the dura.

Diagnosis.—Glioma of chiasm with gliomatous invasion of optic nerve.

Comment.—As stated, a half-hearted clinical diagnosis was made in this case of a pineal syndrome with secondary internal hydrocephalus. This the autopsy did not confirm and the degree of hydrocephalus was less than expected. In view of the post-mortem findings it is difficult to see how the callosal puncture could have possibly influenced the child's condition, and the hydrocephalus was probably a coincidental affair which bore no relation to the chiasmal tumor unless possibly they both are traceable to some congenital fault. Evidently those having the case in charge were misled in their interpretation of the ophthalmoscopic appearances of the optic nerves or else as in Case V the gliosis may have extended to the disks which so altered their appearance as to suggest choking. Unfortunately the intraorbital portions of the nerves were not secured at autopsy. The tumor is of the same histological type as that of Cases VI and VII.

CASE II.—P. B. B. H. Surg. No. 12320. *Presumed suprasellar tumor. Transfrontal exploration. Removal of tumefied segment of right optic nerve. Death six months later.*

April 24, 1920.—Admission of Lawrence A. B., age 25, a coastguard referred by Dr. M. E. K. Sprague of the

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Fig. 7. Case II. Sella turcica showing no apparent abnormalities.

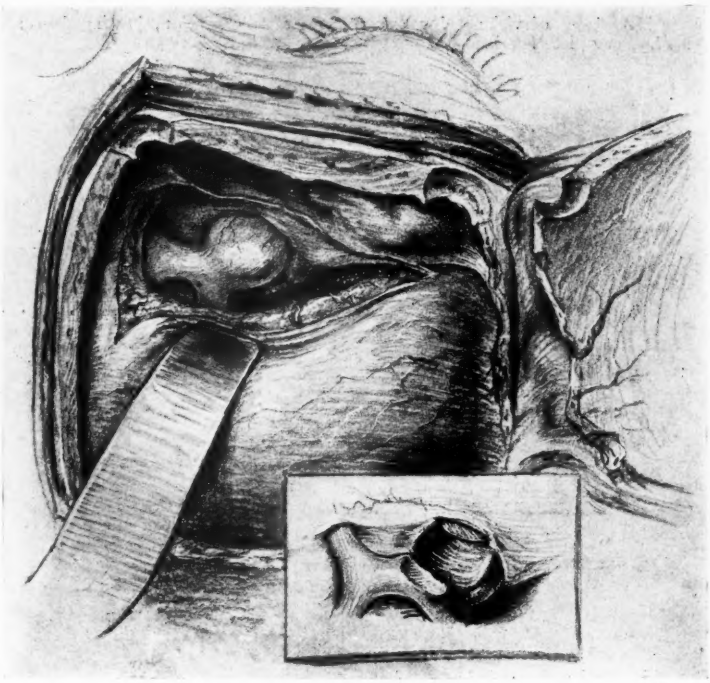

Fig. 8. Case II. Operative sketch showing the exposure of the tumefied portion of the right optic nerve. Insert shows the appearance after the resection.

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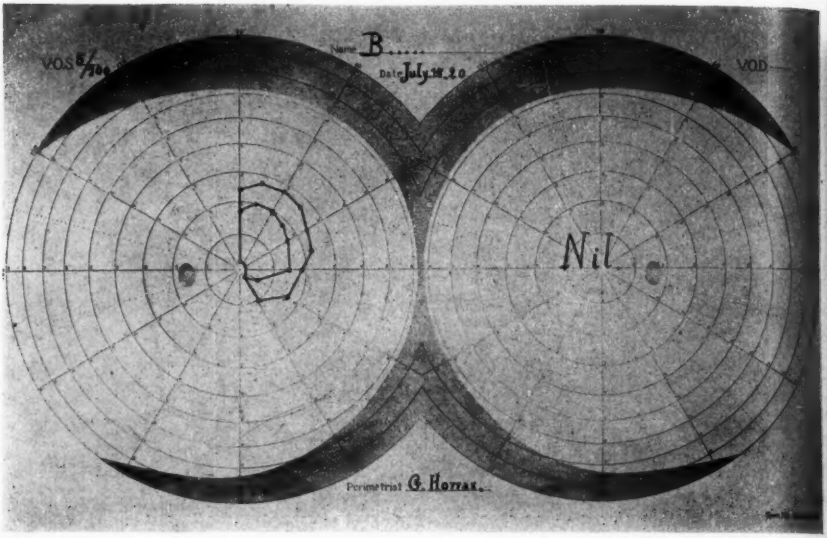

Fig. 10. Case II. Fields of vision taken two months after operation, showing the constriction of the fields and complete hemianopsia.

Fig. 9. Case II. Patient on discharge, showing inconspicuous scar of incision for transfrontal exploration.

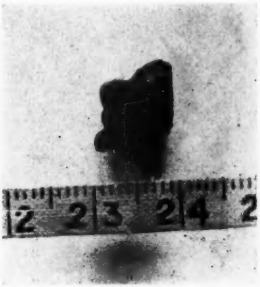

Fig. 11. Case II. Showing segment of enlarged nerve removed at operation.

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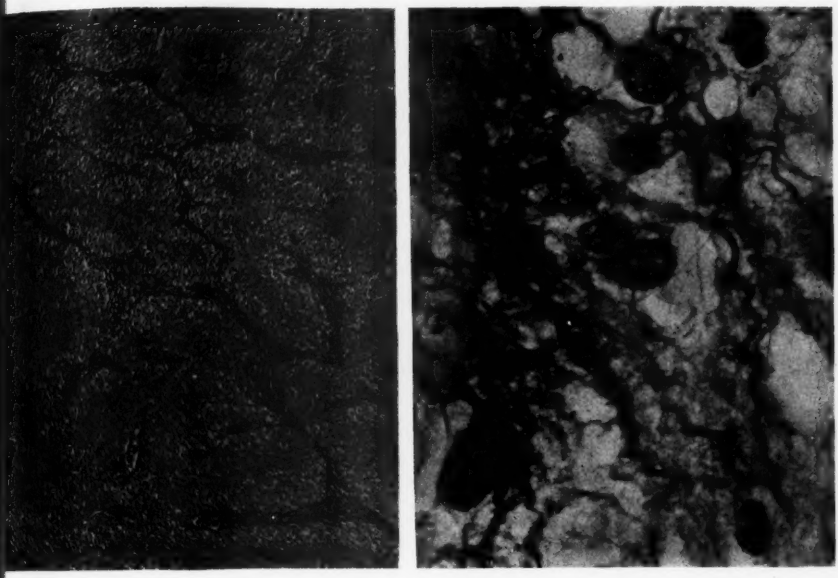

Figs. 12 and 13. Case II. Low-power section (x 80) on the left shows bands of connective tissue representing the normal fascicular architecture of the nerve, the intervals between them occupied by typical gliomatous tumor. The high-power section (x 1500) on the right shows neuroglial cells and fibrils.

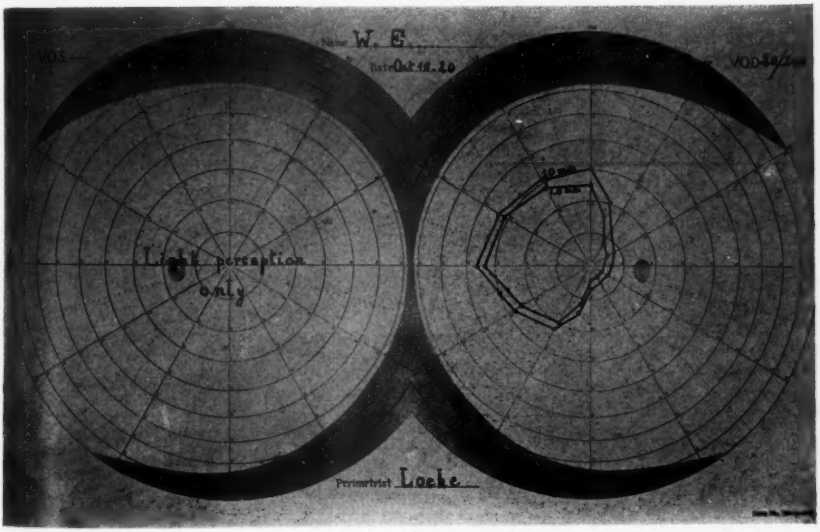

Fig. 14. Case III. Fields of vision taken on admission showing incomplete right temporal hemianopsia.

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Fig. 15. Case III. X-ray showing what was regarded as a normal sella with under-developed sphenoidal cells. Stereoscopically the characteristic undermining of the anterior clinoids from dilatation of the optic foramina is apparent at point indicated.

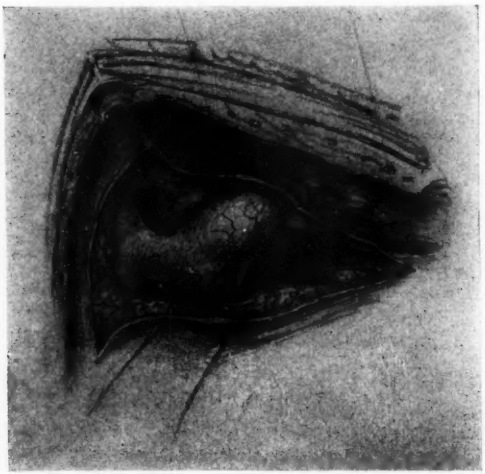

Fig. 16. Case III. Operative sketch showing tumefied right optic nerve and chiasm.

Chelsea Marine Hospital, complaining of loss of sight in right eye. Family and past history unimportant.

Chronology of Symptoms.—Onset four months previous to admission with slight blurring of vision in the right eye. Four weeks before admission vision began to fail on the left; for three weeks complete blindness on the right, with increasing impairment on the left. No headaches, nausea, or vomiting.

Neurological Findings.—Primary optic atrophy; bilateral. Blindness on right with immobile pupil. To the perimeter the left eye shows constriction with defect in the left lower quadrant (Fig. 6). V. O. S. $\frac{10}{100}$. Neurological examination otherwise negative. The X-ray showed what may be regarded as a normal sella (Fig. 7).

Preoperative Diagnosis.—Suprasellar tumor, probably craniopharyngeal cyst originating from Rathke's pouch.[1]

May 5, 1920.—Operation (Cushing).—The usual transfrontal approach disclosed a tumefied enlargement of the right optic nerve. Left optic nerve possibly somewhat swollen and more grayish in color than usual. The enlarged nerve, as shown in the operative sketch (Fig. 8), was first scooped out of the optic foramen and then cut off just at the margin of the chiasm.

Postoperative Notes.—Patient discharged May 20th in good condition (Fig. 9). No alteration in vision. He subsequently had a series of deep X-ray treatments in the hope that the process might be stayed. On the last of his visits, July 16, 1920, his vision still remained $\frac{10}{100}$, but there was now a complete temporal hemianopsia with further contraction of the fields (Fig. 10). He then drifted into other hands. Death occurred *October 18, 1920,* six months after operation. He had become blind and there were said to have been evidences of intracranial advance of the disease. No autopsy.

Histological Note (Dr. S. B. Wolbach).—The sections taken from the fragment of tissue (Fig. 11) show a tumor of unusual appearance composed of large cells with epithelial

[1] The terms "craniopharyngeal pouch" and "Rathke's pouch" as used by the authors in this paper are synonymous. It was Rathke who first described the pharyngeal pouch which is the embryological source of origin of the anterior lobe of the pituitary body. This pouch in the course of its development comes to embrace the infundibulum projecting from the brain which makes the posterior lobe of the hypophysis. As a result of this complicated formation, congenital tumors not infrequently arise. They are for the most part suprasellar and cystic. The epithelial cells become keratinized and calcareous deposits take place in them, shadows of which are usually capable of detection by the X-rays. (ED.)

characteristics without definite arrangement, here and there grouped in areas of considerable size, separated from one another by bands of rather delicate connective tissue in which are many lymphocytes. At the periphery of the tumor there is a considerable layer of circularly arranged fibrous tissue, probably from the optic nerve sheath. In the peripheral portion there are groups of cells of large size mostly with circular outline but occasionally with processes. Here and there are large multinucleated giant cells which contribute to the resemblance that these foci have to tubercles, but there is no necrosis. In the central portion of the section the cells are closely packed so that their outlines in most instances cannot be made out, and a large portion of the cells have a finely granulated cytoplasm. Mitotic figures are numerous. In addition to the multinucleated giant cells which have the appearance of foreign body giant cells, there are large cells with prominent nuclei. With the phosphotungstic-acid-hematoxylin stain there are areas in the tumor in which wavy fibrils are very abundant. (Fig. 13.) These fibrils stain a deep blue and are continued along the processes of the tumor cells after the fashion of neuroglial fibrils. Even the cells with the vesicular cytoplasm and the very large mononuclear cells, and occasionally cells with two nuclei are associated with these fibrils. In the giant cells of the foreign body type there are very many densely staining blue granules which are interpreted as myelin residue. There are areas in the tumor of necrosis and to this is attributed the presence of collections of lymphocytes and eosinophiles. No normal nerve fibers recognized.

Diagnosis: glioma.

Comment.—The operation served merely to disclose an unsuspected glioma of the optic nerve and chiasm in a comparatively early stage of the process. Somewhat at a loss to know what further surgical step should be taken, if any, the tumefied portion of the more affected nerve was removed. The left optic nerve, although found swollen, grayish and evidently involved, was of course left in place, for a surgeon could hardly bring himself to remove the entire chiasm under these circumstances, even had there been some prospect of completely removing the lesion, thereby assuring a cure even at the expense of immediate and permanent blindness.

CASE III.—P. B. B. H. Surg. No. 13340. *Presumed suprasellar tumor. Osteoplastic frontal exploration with dis-*

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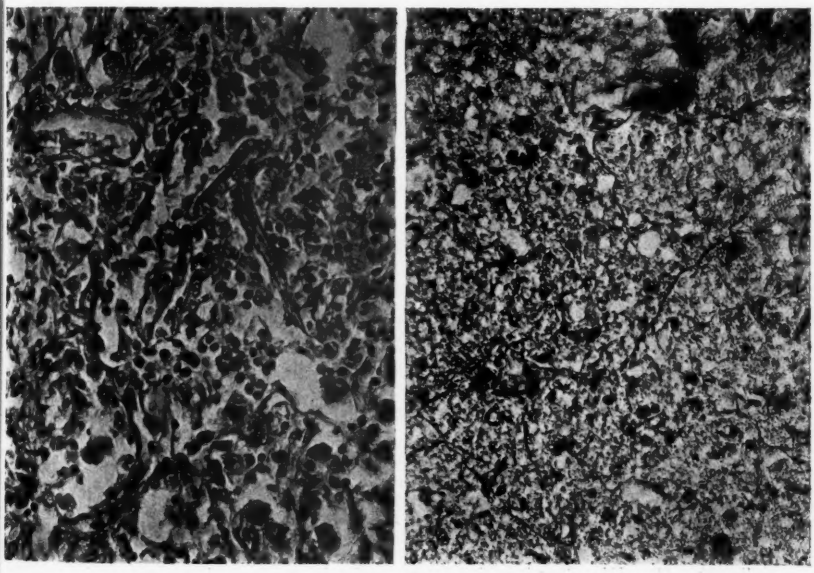
Fig. 17. Case III. Median sagittal section of the brain showing internal hydrocephalus and the cystic tumor which occupies the chiasm and pushes up behind the third ventricle compressing the foramina of Munro.



Figs. 18 and 19. Case III. The section of the chiasmal tumor on the left (x 300) shows typical glial cells and fibrils, and also a number of round cells. The section on the right (x 300), of the optic nerve, shows the abundant fibrillæ and no trace of the architecture of the nerve.

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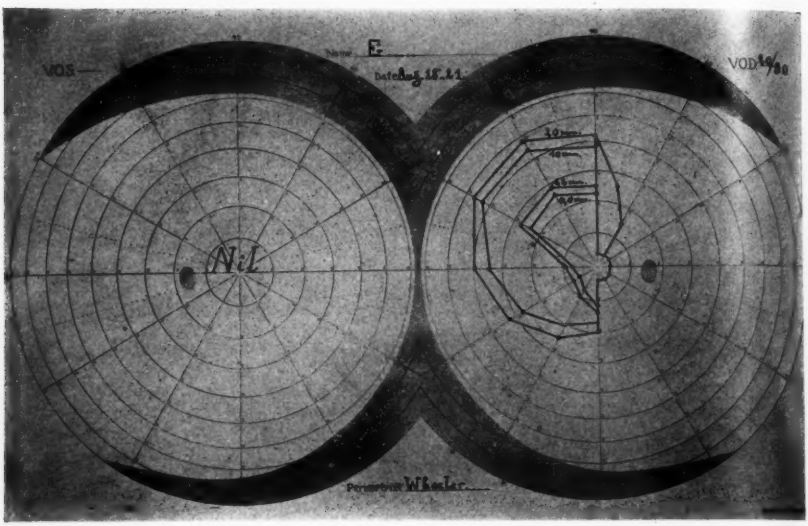

Fig. 20. Case IV. Fields of vision showing a right temporal-field defect short of a complete hemianopsia.

Fig. 21. Case IV. Showing slightly enlarged sella, with overhanging anterior clinoids, and pressure erosion of the dorsum.

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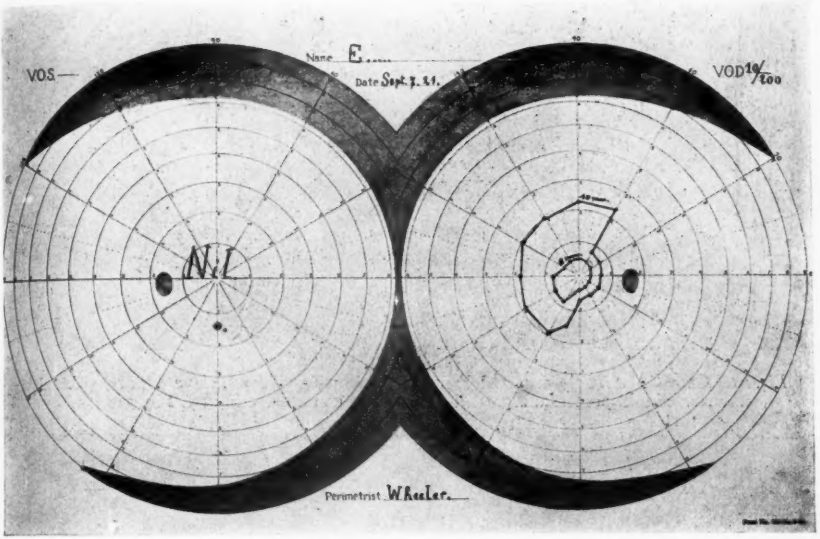

Fig. 23. Case IV. Fields of vision taken before discharge, showing further constriction with lowered visual acuity.

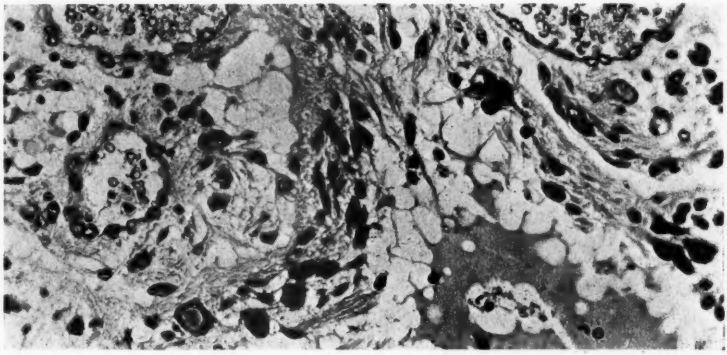

Fig. 24. Case IV. Section of tumor (x 300); probably the type of optic-nerve glioma frequently called "myxosarcoma."

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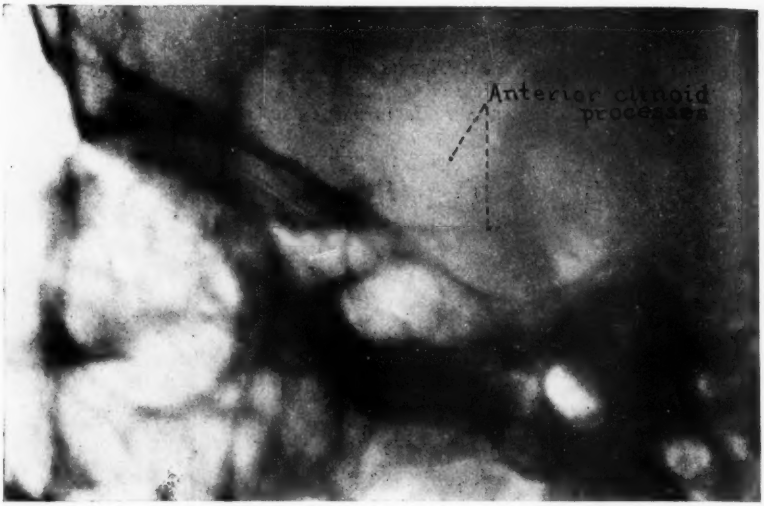

Fig. 25. Case V. A badly centered X-ray plate showing thinned, elevated, and pointed anterior clinoid processes regarded at the time as uninforming (*cf.* Fig. 31).

Fig. 26. Case V. Base of brain showing the tumor, from which the thickened optic nerves emerge. The stalk of the pituitary body is evident and the carotid arteries are seen to indent the growth on each side. Where the left temporal lobe has been cut away one may see that the optic tract is tumefied for a short distance from the main tumor.

closure of a chiasmal glioma. Postoperative hyperthermia. Autopsy.

October 14, 1920.—Admission of William H. E., age 14, referred by Dr. G. S. Row of Indianapolis, Indiana, with the complaint of loss of vision, frontal headaches, and obesity. Family and past history without bearing on the condition.

Chronology of Symptoms.—In November of 1919 the boy, who had previously been thin, began rapidly to put on weight. In July of 1920 there was an onset of blurred vision, which progressed. Drowsiness and frontal headaches followed.

Positive Neurological Findings.—Obesity. Absence of pubic and axillary hair (not however regarded as a typical example of adiposogenital dystrophy). Primary optic atrophy with blindness on the left and marked loss of vision on the right. The perimeter showed an extensive defect of temporal field on the right regarded as an imperfect temporal hemianopsia (Fig. 14). Slight external strabismus on the right. Pupils: left immobile; right reacts very sluggishly to light. X-ray of the skull reported as showing a slight convolutional atrophy of the vault with widening of the sella, but in both respects this report was discredited in the ward. (Fig 15.)

October 21, 1920.—Operation (Cushing) for presumed suprasellar tumor of craniopharyngeal-pouch origin. Osteoplastic frontal resection. Region of chiasm brought into view without difficulty, disclosing the involvement of the right optic nerve and chiasm (*cf.* operative sketch, Fig. 16) in a reddish tumefaction. The left nerve appeared to be fairly normal in size. The condition was regarded as inoperable and the wound was closed. There was an immediate postoperative hyperthermia, the temperature reaching 107° F. within a few hours. The patient never regained consciousness and died in thirty-six hours.

Autopsy.—The brain, removed after fixation, reveals no operative or postoperative complication; no evidence of contusion, clot or infection. There is a moderate internal hydrocephalus. The right optic nerve is enlarged by a tumor mass which extends upward behind the third ventricle (Fig. 17).

Histological Note.—(1) Sections of the tumor (Fig. 18) taken in various places show it to be composed chiefly of spindle and spider cells with long glia fibrillæ which, together with much collagen from the blood vessels, make up the œdematous stroma. Cells of large type with pale and abundant cytoplasm and small sharply staining round nuclei abound in all parts of the tumor. Mitotic figures are

numerous. The sections across the right optic nerve show the nerve to be more seriously involved than in Case II, for here there remains no trace of the architecture of the nerve and long fibrils are particularly numerous (Fig 19).

(2) A longitudinal section though the pituitary gland shows an unusual number of glial cells and fibers in the stalk which the growth has apparently begun to infiltrate.

(3) Cross sections taken through the optic tract show a great number of neuroglial fibrils from what appears to be a secondary gliosis but no actual tumor.

Comment.—In this case, as in the preceding one, an operation was performed with the expectation of finding a pharyngeal-pouch tumor. The operation was conducted without particular incident and the wound closed as soon as the nature of the lesion was recognized. Nevertheless, hyperthermia occurred and all efforts symptomatically to combat the high temperature were unavailing. This matter will be subsequently referred to.

A re-examination of the X-ray plates shows that although neither of the pair gives an exact lateral view, in the stereoscope they show an apparent anterior extension underneath the clinoid processes, representing, as we now incline to believe, the dilated optic foramina (Fig. 15 O. F.).

Case IV.—P. B. B. H. Surg. No. 15043. *Provisional diagnosis of suprasellar tumor. Transfrontal exploration disclosing a glioma of the chiasm. Operative recovery.*

August 16, 1921.—Admission of Frederick C. E., age eight, referred by Dr. W. E. Monroe of Rochester, New York, with complaint of loss of vision. Family and past history essentially negative.

Chronology of Symptoms.—In the summer of 1919 with no premonitory symptom it was observed that the boy could not see with his left eye and when examined it was found that vision in the outer field of his right eye was also impaired. In April, 1921, onset of frontal headaches and vomiting.

Positive Neurological Findings.—Nothing beyond a bilateral primary atrophy, with a low grade of what was taken to be a super-imposed papillœdema on the right; also complete blindness on the left and a temporal hemianopsia on the right (Fig. 20). The cranial X-ray showed some convolutional atrophy with slight separation of cranial sutures; the sella was enlarged (Fig. 21) in its antero-posterior diameter with marked erosion of the erect dorsum.

Provisional Diagnosis.—Pharyngeal-pouch tumor with hydrocephalus.

August 22, 1921. Operation (Cushing).—Osteoplastic right transfrontal procedure. Puncture of ventricle; fluid under considerable tension, but apparently not in great excess. Right optic nerve found to be discolored, enlarged, and to emerge in conical shape from a tumor which made it impossible to see or identify the left nerve. A small fragment of tissue was removed for diagnosis.

Postoperative Notes.—The patient made a good recovery (Fig. 22). He was discharged on September 18th, at which time the fields of vision had become still further constricted (Fig. 23).

Pathological Note.—The fragment of tissue removed shows on section a somewhat vascular tumor with a relatively large amount of intercellular substance. The cells are round to oval and are scattered among interweaving delicate intercellular tissue strands which take the neuroglia stain. An occasional mitotic figure is present. It shows in areas the perivascular cellular reaction common in gliomas in general. The tumor is of the type often erroneously designated as myxosarcoma (Fig. 24). *Diagnosis:* glioma.

Subsequent Reports.—Letter from mother *November 6, 1921*, reports that patient had been having a period of drowsiness but had recovered. On *January 29, 1922*, she reported patient happy, playing outdoors most of the day, and still with sufficient vision to get about alone. A later report, *June 13, 1922*, vision almost gone; beginning to show exophthalmos of right eye; slight elevation of bone flap; otherwise in very good general condition. Death *August 30, 1922*, one year after operation.

Comment.—Before this unfortunate little boy's end the process had apparently extended to the intraorbital portions of the nerves with the production of exophthalmos. Without autopsy the diagnosis of a primary chiasmal lesion cannot be absolutely assured. The optic nerve on the side chiefly involved, the left, was not seen at the time of operation. The microscopic picture of the tumor, moreover, is very unlike that of the other cases in the series, being more of the "myxosarcomatous" type described by others. It is possible that it might have taken its origin in the hypophysial stalk or posterior lobe and have invaded the chiasm secondarily, but one would hardly have expected so great destruction of the chiasm had this been the case. Nor do these lesions tend to

invade the orbit and produce exophthalmos. The only indication of involvement of the hypophysis was a low metabolic rate (−22); otherwise there were no signs of dyspituitarism.

CASE V.—P. B. B. H. Surg. No. 16111. *Presumptive brain abscess. Subtemporal exploration. Death with hyperthermia. Autopsy: glioma of optic chiasm.*

February 18, 1922.—Admission of James P., age 56, referred by Dr. W. J. Daly of Boston, complaining of frontal headaches and loss of vision.

Chronology of Symptoms.—Onset ascribed to an injury with laceration of the scalp received five months before admission. The wound was sutured, became infected, was reopened and suppurated for some days. Soon after this the patient began to complain of soreness and right-sided headache. Two weeks later his vision began to fail, more rapidly on the right than left. For three months there has been complete bilateral blindness. Two or three attacks of projectile vomiting have occurred. He has been untidy, unruly, and disoriented for the past three weeks.

Positive Neurological Findings.—Marked stupor. Choked disk (?) of 2 to 3 D. with extreme atrophy (regarded as secondary). No exophthalmos. X-ray examination (unsatisfactory because of poor coöperation) shows no evidence of intracranial tension. Sella (Fig. 25) imperfectly shown but regarded at the time as uninforming. Temperature on admission 102°. Leucocytes 22,000. Subsequent slight daily elevation of temperature.

A tentative diagnosis of cerebral abscess was made with no definite localization.

February 28, 1922. Operation (Martin).—An exploratory subtemporal decompression disclosed a wet brain without apparent increase of tension. Two exploratory punctures failed to disclose an abscess or to reach the ventricle.

Postoperative Note.—Following the operation the patient became progressively more stuporous and died the second morning in hyperthermia.

Pathological Note.—Brain removed within its meninges after preliminary fixation. At the base, lying between the cerebral peduncles, there is a nodular tumor about 3 *cm.* in diameter, occupying the site of the optic chiasm (Fig. 26). The tumefied optic nerves can be seen to emerge from each side of the anterior portion of the growth. Pursued into the orbit they were found to be thickened even as far as the globe.

The optic tract on one side, exposed by cutting away the temporal lobe, proves to be invaded by tumor for a short distance from the tumefied chiasm (*cf.* Fig. 26) behind

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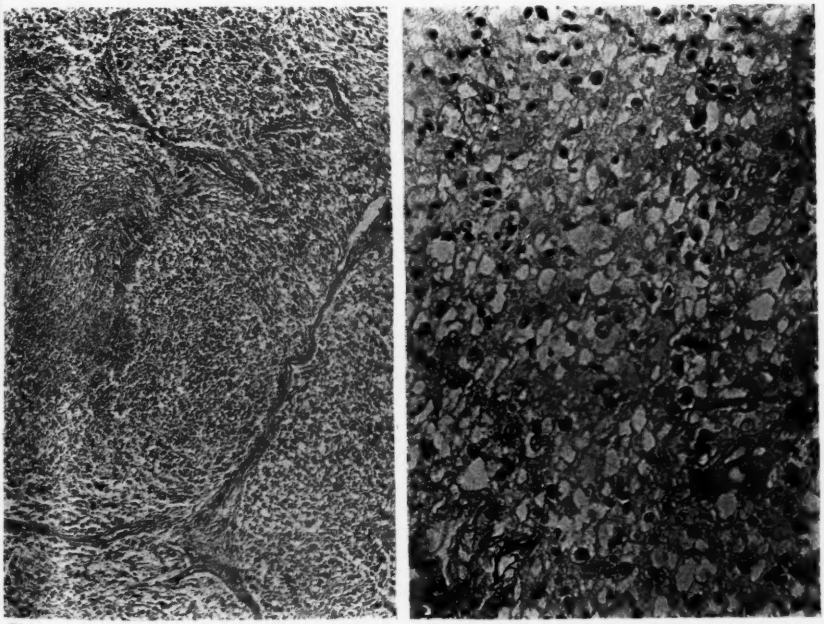
Fig. 27. Case V. Longitudinal section of the brain showing the tumor extending upward into the space occupied by the third ventricle.



Figs. 28 and 29. Case V. Section on the left under low power (x 80) through the optic nerve near its orbital junction, showing typical gliomatous structure between the normal connective tissue bands. On the right a higher magnification (x 300) showing a few fibrils and cytoid bodies.

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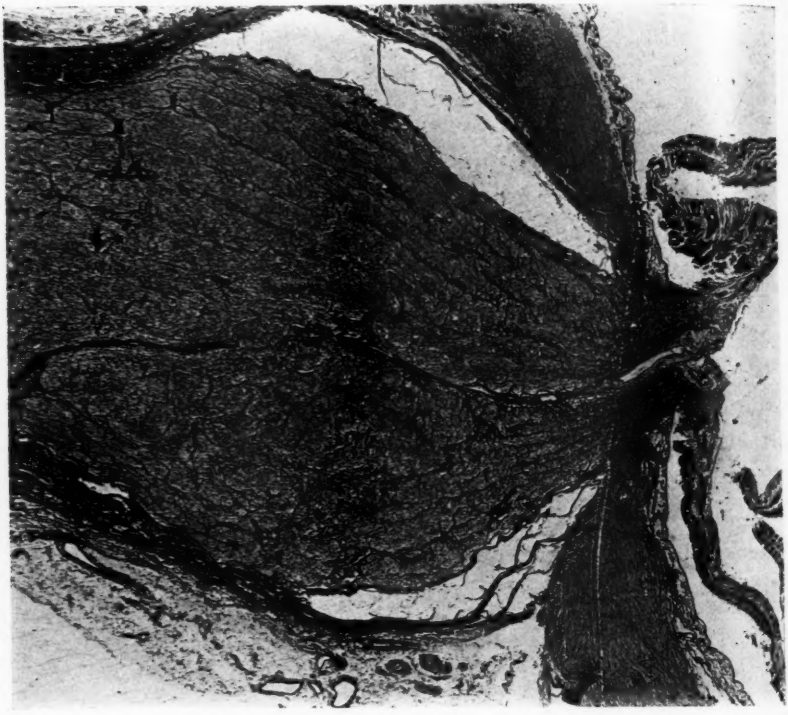

Fig. 30. Case V. Longitudinal section through optic nerve and disk showing the extension of the tumor even to the papilla explaining the measured swelling of 2–3 D. observed clinically but misinterpreted.

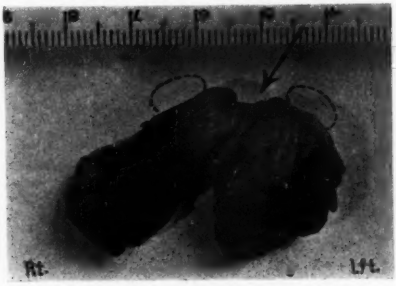

Fig. 33. Case VI. Tumor removed at operation (nat. size) seen from below. Dotted ovals show approximate position of optic foramina. Arrow points to median cleft.

which in the midline the apex of the infundibulum is readily identified. A sagittal section (Fig. 27) shows the tumor occupying the site of the third ventricle. No apparent hydrocephalus.

Histological Note.—Blocks taken from the main tumor mass as well as from the optic nerves and tract show the growth to be somewhat vascular with abundant collagen fibrils about the vessels. A section of the nerve stump near the optic foramen shows traces of the original architecture of fibrous tissue between which is a massive glioma and no recognizable nerve fibres (Fig. 28). There are comparatively few well-stained neuroglial fibrils (Fig. 29). Mitoses not infrequent. The tumor in places shows a few small cysts. Sections through the optic nerves (Fig. 30) show them to be involved in the process as far as the optic papilla. *Diagnosis:* glioma of chiasm.

Comment.—We were misled in this case by the undue emphasis laid on the story of a recent infection of the scalp, which, supplemented by his fever and leucocytosis, led to a presumptive diagnosis of abscess. Moreover his mental condition was such as to preclude many of the usual details of examination. We should have been made suspicious by the complete blindness, which would hardly have been expected with abscess, and also by the atrophic pallor of the obviously swollen disks which, however, showed no new tissue formation. There was a measurable swelling which we recognized as somewhat peculiar in its appearance, but beyond this we could not go. As the examination now shows, the swelling was due to an extension of the growth the full length of each of the nerves. It is quite possible that more expert ophthalmologists than ourselves might have recognized that the projection of the disks was due to tumor rather than to a papillœdema superimposed on an atrophy.

It is to be especially noted that neither adiposity nor polyuria were present. However, there was marked somnolence disproportionate to his general pressure symptoms and which in view of the findings must be considered as possibly a neighborhood symptom. It is conceivable that the fever in some way represented a thermo-regulatory disturbance, but this does not account for the leucocytosis. The patient hardly regained consciousness after the decompression and died forty-eight hours later in hyperthermia.

Unfortunately the process had become too far advanced for perimetry, and it is also unfortunate that it was impossible, owing to his condition, to get a good X-ray negative. For if there is anything in our impression that these tumors give a characteristic anterior elongation of the sellar profile, this case should have shown it as well as any of the others. A proper interpretation of the plate with its oblique view of the sella (Fig. 25) and its long, overhanging, thin anterior clinoid processes, becomes possible by comparison with the sella of the following case (*cf.* Fig. 32).

CASE VI.—P. B. B. H. Surg. No. 16342. *Presumed suprasellar tumor from cranio-pharyngeal pouch. Neurofibromatosis* (?) *Right osteoplastic frontal bone flap: partial enucleation of tumor: postoperative fatality. Autopsy: glioma of the optic chiasm.*

March 28, 1922.—Admission of Mary E. D., aged six, referred by Dr. Charles G. Beall of Fort Wayne, Indiana, with the complaint of failing vision and drowsiness.

Family and past history unimportant except that the mother presents a mild hyperthyroidism, and in addition to the usual diseases of childhood the patient has had a lisp for which two minor lingual operations were performed early in life.

Chronology of Symptoms.—Eight months ago onset with failing vision. The child became a little apathetic, and the mother noticed that she was gaining in weight a little faster than previously. For the past four months there has been headache with vomiting. There has also been some change in disposition and she has become "cranky."

Positive Neurological Findings.—Primary optic atrophy. Near blindness. Pupils react sluggishly to light. Narrowing of fields of vision to rough test but coöperation not sufficiently good for reliable perimetry. Slight adiposity (Fig. 31). Slight enlargement of the thyroid. Marked irritability. Some small pigmented patches under the left nipple and left side, but no other signs suggesting generalized neurofibromatosis.

The cranial X-ray shows an increase in the depth of the meningeal channels and some convolutional atrophy. The sella (Fig. 31) shows a marked hour-glass deformation with extension forward under the unusually long and pointed anterior clinoid processes.

Preoperative Diagnosis.—Probably pharyngeal pouch (suprasellar) tumor.

April 7, 1922. Operation (Cushing).—After elevation of

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Fig. 31. Case VI. Photograph of patient on admission, *cf.* pigmented patches on left trunk below nipple.

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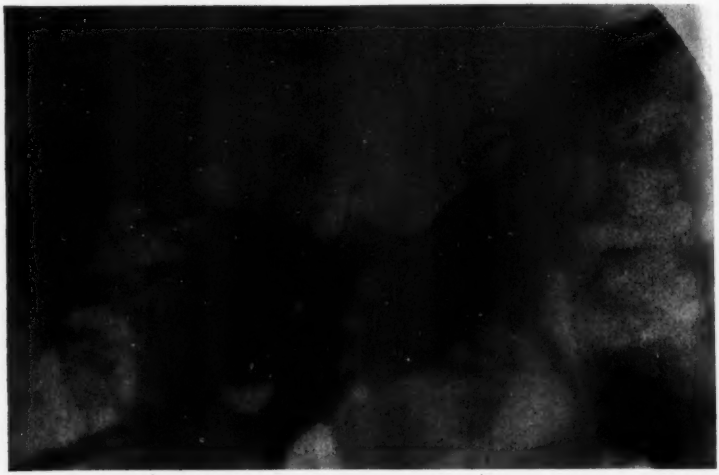
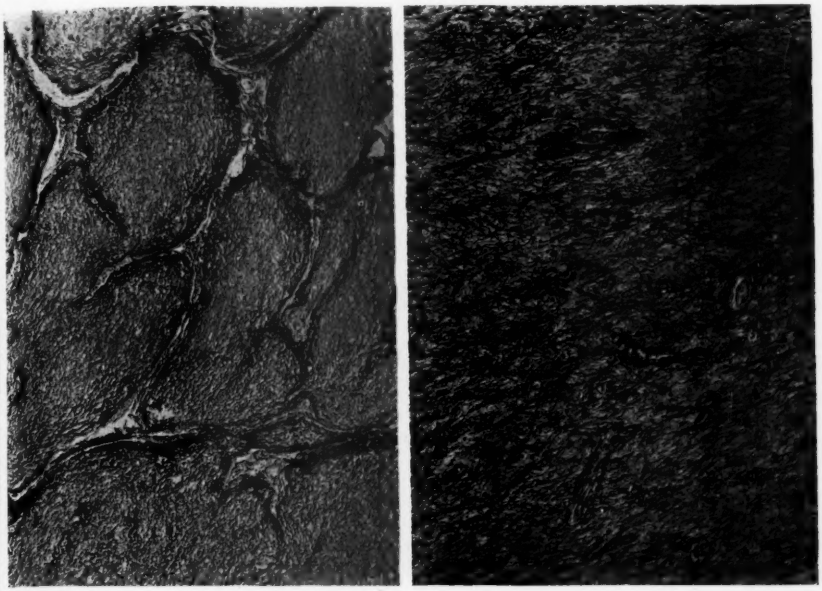


Fig. 32. Case VI. X-ray showing the apparent anterior extension of the sella under the thinned and elevated anterior clinoids from distension of optic foramina.

Fig. 34. Case VI. Mid-longitudinal section of the brain showing the remaining stump of the tumor which has displaced the third ventricle backwards.

ILLUSTRATING DR. PAUL MARTIN AND DR. HARVEY CUSHING'S ARTICLE ON "PRIMARY GLIOMAS OF THE CHIASM AND OPTIC NERVES IN THEIR INTRACRANIAL PORTION."



Figs. 35 and 36. Case VI. On the left a low-power section of the tumor (x 80) taken through the nerve and showing traces of its architecture. On the right a higher magnification (x 300) showing very abundant glia fibrils and a few cytoid bodies.

Fig. 37. Case VII. X-ray of sella, unfortunately not in a direct perpendicular plane, nevertheless shows apparent extension of sellar fossa under anterior clinoids due (?) to dilated optic foramina.

ILLUSTRATING DR. PAUL MARTIN AND DR. HARVEY CUSHING'S ARTICLE ON "PRIMARY GLIOMAS OF THE CHIASM AND OPTIC NERVES IN THEIR INTRACRANIAL PORTION."

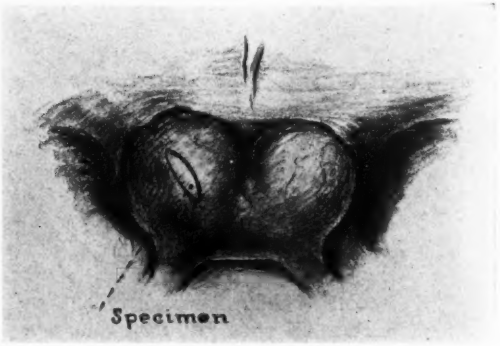


Fig. 38. Case VII. Sketch of appearances seen at operation, precisely like those of Case VI in which tumor removal was attempted.

Fig. 39. Case VII. Patient showing scar of usual incision ten days after transfrontal operation for suprasellar exposure.

the frontal lobe and exposure of the chiasmal region a roundish tumor, of firm consistency suggesting an endothelioma, was disclosed lying in about the position of the right optic nerve. On investigating further another similar mass to the left was brought into view. There was no suspicion at the time that the tumor was chiasmal in origin. An effort was made to identify the nerves and on the right side was seen what was taken to be a dislocated grayish nerve, though it proved to be the carotid pushed downward by the growth. The two legs of the tumor were bluntly dissected out from under the ridge between the clinoid processes and the growth, which was firm, was gradually and easily dislodged and gently drawn forward. This manipulation, however, caused a sudden cessation of respiration which lasted about one-half hour and required artificial respiration. After spontaneous breathing had been resumed, the tumor (Fig. 33) was dislodged in what seemed its entirety, the procedure being practically a bloodless one. It was most disconcerting after the removal of the growth not to be able to identify the optic nerves, which were thought to have been overlain by it. Not until this disclosure was the suspicion aroused that a primary tumor of the chiasm had been removed—a tumor which had involved and completely obliterated the nerves.

Postoperative Note.—The patient did badly after the operation; at its close her temperature was 104°. Respirations were regular all through the night, but early in the morning they became shallow and she expired without having regained consciousness. Temperature 106°.

Pathological Note.—Brain removed after carotid injection with fixation in situ. The intraorbital portions of the nerves unfortunately were not removed. The base of the brain shows a clean operative defect, free from blood clot, resulting from the removal at operation of optic nerves, optic chiasm, and all but a stump of the left optic tract. A sagittal section (Fig. 34) shows the remaining stump of a tumor which extends upward to the third ventricle but is not large enough to cause an internal hydrocephalus by blocking the foramena of Munro. The brain is otherwise normal.

Specimens for microscopic study were taken from the chiasmal tumor itself, from the floor of the third ventricle and also from the optic nerve and tract. Sections from the first two sources are similar and represent true tumor formation, a solid mass of neuroglia fibrils, and small round and oval cells which are unquestionably glial (Figs. 34 and 35). No mitoses are seen. In some of the sections from the floor of the third ventricle one finds basic staining

amorphous material in masses and strands which, no doubt, represents the so-called cytoid bodies found in these tumors. Sections of the hypophysis show a rather large but histologically normal gland.

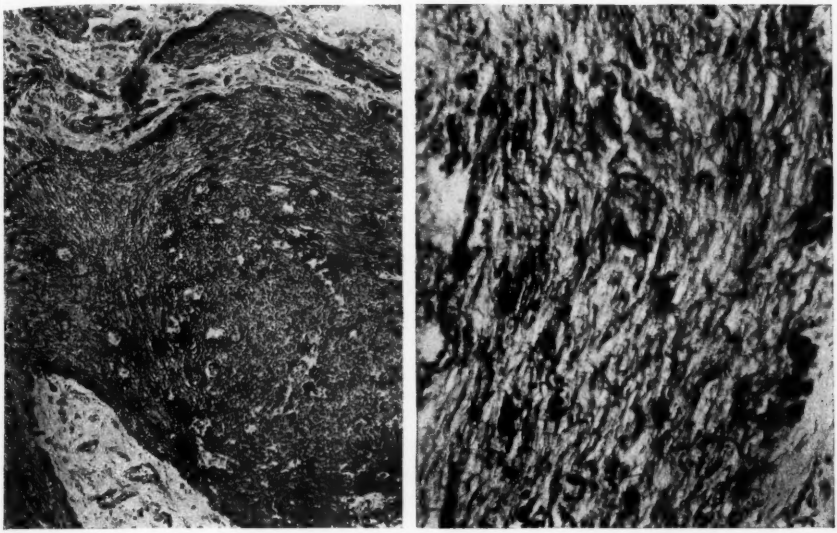
Comment.—Our sorry experience with this particular case was what led us to make this review of the subject with its unexpected disclosure that the preceding five cases represented a lesion of comparable type and from the same source. The preoperative diagnosis, based on the primary optic atrophy, the suggestive adiposity and the slightly deformed sella, as in three of the foregoing cases, was again in favor of the more common lesion of this region, namely a suprasellar cyst of cranio-pharyngeal pouch origin. At the operation the optic nerves were found to be so completely involved in the process that they were not recognized and there was thought to be an enucleable tumor overlying the nerves and chiasm. Accordingly in removing the growth both optic nerves and the entire chiasm were dissected out and the posterior extension of the tumor, which proved to be a tumefied tract, was withdrawn. It was a sad error not likely to occur again, for the appearance is an unmistakable one when once appreciated. The operation resulted in a fatality in hyperthermia.

It is unfortunate that the intraorbital portions of the nerves were not removed at autopsy. They were almost certainly involved in the process for the optic foramina were obviously much enlarged.

One thing more deserves comment, namely the patches of brownish pigmentation shown in this child's skin (*cf.* Fig. 31), which may possibly be interpreted as a tell-tale of von Recklinghausen's disease. Moreover, the tumor had a different histological architecture from all the preceding ones, with the exception possibly of the first. In both these respects the case appears to be more closely allied to the following and last one in the series, in which for the first time a presumptive diagnosis of chiasmal tumor was made before operation.

CASE VII.—P. B. B. H. Surg. No. 12320. *Generalized neurofibromatosis with progressive blindness. Transfrontal operation with verification of inoperable glioma of nerves and chiasm. October 24, 1922.*—Admission of Rachel S., age 20, referred

ILLUSTRATING DR. PAUL MARTIN AND DR. HARVEY CUSHING'S ARTICLE ON "PRIMARY GLIOMAS OF THE CHIASM AND OPTIC NERVES IN THEIR INTRACRANIAL PORTION."



Figs. 40 and 41. Case VII. Sections of fragment removed for histological verification. Showing masses of neuroglia fibrillæ (x 80 left: x 300 right).

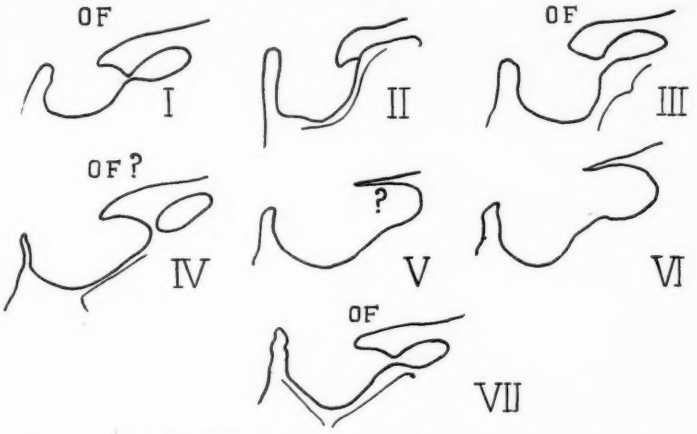


Fig. 42. Profile drawings of the sella in the seven cases as interpreted by stereoscopic views. In Case I, though advanced, the optic nerves were not greatly enlarged beyond the foramen. In Case II the process was an early one. In Case III one nerve was greatly enlarged at the foramen. In Case IV the process was advanced, in Cases V and VI still more so.

by Dr. B. S. Chaffee of Long Beach, California, with the complaint of failing vision and intracranial discomforts.

Clinical History.—Her parents and their five other children are healthy and well. She had the usual infectious diseases of infancy in mild form. She has always had defective vision and was born with a squint for which an operation was performed in her sixth year. At seven a tumor of some sort was removed from her nose. She had a precocious adolescence and her menstruation was established at nine but has always been scanty and most irregular. She averages about four periods each twelve months. At eleven a neuroma of the median nerve was removed from her right arm, and at the time her parents were told that she had a brain tumor also. Always addicted to colds, her tonsils were removed two months before admission.

She has always been somewhat obese and short in stature, but others in the family tend in this direction. She is intellectually alert and mature for her age.

Throughout her life chief concern has been felt for her defective eyesight, which has been slowly and progressively failing. For this she has seen many physicians. When examined by Dr. Lloyd Mills in March, 1922, there was practical blindness on the left and on the right vision was reduced to $\frac{8}{60}$. A small field of central vision was all that remained. The X-ray showed a deformed sella, and under the supposition that she had a pituitary cyst she was given glandular feeding without avail. Three months later her vision had dropped to $\frac{1}{60}$ and there was so great complaint of increasing retro-orbital discomforts that an operation of some sort was thought necessary if only to establish a diagnosis.

Physical Examination.—A bright, intelligent, and cooperative, somewhat adipose girl weighing 56.7 kilos; height 143.7 *cm.* There are numerous pigmented moles, mollusca fibrosa, and patches of brownish pigmentation over the trunk, chiefly on thorax and back. Near the right popliteal space is a large plexiform neuroma. Her skin, moreover, has the peculiar odour characteristic of von Recklinghausen's disease.

Aside from these cutaneous lesions typical of neurofibromatosis and the condition of her eyes, the neurological examination was essentially negative. The pupils were considerably dilated with sluggish reaction to light. The fundi showed pale atrophic nerves with no vascular stasis or elevation. Vision on the left was reduced to faint light-perception. On the right it was estimated at $\frac{8}{360}$. Perimetry was impossible though the patient thought that the perception of test objects was confined to the nasal retina.

The X-ray (Fig. 37) shows stereoscopically an apparent anterior extension of the sella due to dilatation of the optic foramina, with prominent anterior clinoids but with no pressure erosion and no suprasellar shadows.

Her hypophysial or polyglandular symptomatology aside from the adiposity and the history of early puberty is negative. No polyuria, somnolence, etc. The basal metabolism was estimated at −13.

Preoperative Diagnosis.—Generalized neurofibromatosis with cranial-nerve involvement; presumable neurinoma of chiasm.

November 3, 1922. Operation. (Cushing).—A right transfrontal osteoplastic resection. An exceptionally good view of the chiasm was secured. It revealed a symmetrical tumefaction involving chiasm and nerves up to the optic foramina (Fig. 38). A wedge-shaped piece of tissue was removed from the left (the blind side) for verification. The tumor was firm and relatively non-vascular. It was evidently not the usual neurinoma-type of tumor. The bone-flap was replaced and closed without further measures.

Postoperative.—She made a proper recovery from the operation. Her symptoms remained unaltered. Radiotherapy as a chance source of relief was inaugurated and she was discharged November 17th (*cf.*, Fig. 39). A few days later she returned to present herself at the clinical demonstration mentioned in the introductory foot-note.

Pathological Note.—Serial sections were taken from the small block of tissue. Variously stained they show an outer fibroma capsule underlain by dense neuroglia tissue (Figs. 40–41). There are a few strata of connective tissue, possibly the remains of optic-nerve structures. The neuroglia consists largely of masses of fibrils. There are no mitotic figures of undifferentiated cells. There are cytoid bodies as well as globular and rod-like masses of hyalin such as Verhoeff has described in his cases of glioma.

Comment.—There could be little doubt of the structure involved by the tumor in this case before the operation. However, in view of our unfamiliarity with these cranial nerve tumors apart from those involving the acusticus, there was sufficient uncertainty, as to the exact type of lesion which would be found, to justify the exploration which was strongly urged. The chief uncertainty was occasioned by the knowledge that in cases of generalized neurofibromatosis, as is known, there may be multiple meningiomas (dural endothelio-

mas)[1] as well, and there was a possibility, in view of the chronicity of the process, that one of these tumors arising from the suprasellar diaphragm and involving the chiasm might be encountered.

A lesion of the neurinoma type was anticipated and it was hoped that a soft encapsulated tumor would be found which could be partially enucleated with some chance at preservation of the remaining nerve fibers or even of some restoration of vision; for in some of the acoustic tumors thus treated, hearing may subsequently be improved.

Even when the tumor was exposed and found to have originated in the chiasm and the section from the blind nerve was removed for histological verification, we had little doubt but that it would prove to be a neurinoma though it was more firm than the usual run of these tumors and showed no evidence of the fatty degeneration they are prone to undergo. All of this indicates how much we have to learn regarding these lesions.

The tumor closely resembles that of the preceding case and of Case I, and is gliomatous beyond question.

General Considerations

These clinical records have been presented in abstract largely as they occur in the formal case histories. It has been difficult, however, not to write into them some of the observations and opinions which have been the result of our subsequent study of the group of cases as a whole. It was not until the calamitous undertaking in Case VI that the condition was revealed to us in its true light and we were enabled not only to interpret the earlier cases but to make a proper diagnosis in the last of the patients. Our views, consequently, as they now stand are not those held at the time the patients were under observation: for example the discovery of the extension of the tumor to the nerve head in Case V has only been a recent finding. Moreover, our present interpretation of the X-ray deformations, which except for Case VI caused

[1] This matter has been fully discussed in the monograph by one of us on the *Tumors of the Nervus Acusticus*, 1917, W. B. Saunders Co., Phila., Chap. VIII, p. 210.

little comment at the time the plates were taken, are new and possibly may have to undergo some alterations as further experience may dictate.

Little in the way of discussion or summary, needs to be added to the separate comment upon each of the six clinical histories which have been given. It may be noted that in four cases the symptoms originated in the first decade, the youngest patient at operation having been four years of age. One of the patients, however (Case V) was in his sixth decade.

The region occupied by the growth was recognized before operation in five instances, though in only the last of them was its possible primary source of origin in the nerves or chiasm taken into consideration before the lesion was exposed at operation. Even when so exposed, in one instance (Case VI) because of the extensive involvement which had completely obliterated the chiasmal landmarks, the actual condition was not recognized till an attempted enucleation revealed its true source.

In two of the seven cases (Nos. I and V) the lesion was not even localized during life, owing partly to poor coöperation and partly in each instance to an imperfect and misleading history. Notwithstanding this, a tumor in the suprasellar region under ordinary circumstances is not at all difficult to localize, and in the presence of a fairly normal rather than a greatly enlarged sella the preponderance of the congenital tumors originating from Rathke's pouch over tumors of all other types leads in the long run to a preferential diagnosis of such a lesion. Nevertheless, in the radiographic absence of shadows produced by the calcareous deposits common in these lesions, one may well hesitate in arriving at such a diagnosis in view of these seven experiences.

Diagnosis.—It would be highly desirable if these lesions could be distinguished from the far more common tumors of the interpeduncular region which involve the optic chiasm secondarily. It is evident from what has been said, that, except in the presence of obvious evidences of von Recklinghausen's disease, we must depend in a differential diagnosis largely upon three sources of information: the ophthalmoscope, the perimeter and the X-ray.

All seven cases showed an advanced optic atrophy, and in five there was no doubt of it being primary, as would be ex-

pected from a lesion of any sort whatsoever compressing the nerves or chiasm; and, so far as we can see, the ophthalmoscopic picture of these conditions is indistinguishable. In Case V, however, the nerve showed in addition to the atrophy a measurable protrusion which was mistaken for a choked disk until the post-mortem examination revealed an extension of the tumor through the entire intraorbital course of the nerve. In two other cases (I and IV) the atrophic nerve was thought to show a superimposed œdema which was attributed to a presumed internal hydrocephalus. This is a matter sometimes most difficult to determine, as one of us has pointed out on several occasions,[1] and in these two cases as in Case V the appearance mistaken for a papillœdema may have been due to tumor. From an ophthalmoscopic standpoint, therefore, we have not much to go on unless the tumor happens to have extended to the nerve head where, by an ophthalmologist, more expert than ourselves, it might be recognized as Verhoeff thus recognized the lesion in one of his cases.

The loss of vision in all instances, with the exception of the last, has been comparatively rapid and progressive, so that by the time the patients came under observation it had advanced to blindness in one eye at least. One patient was totally blind on admission, and two of the young children, in whom the registration of visual acuity was not possible, had apparently but little vision remaining. In the three patients whose acuity was recorded, vision was lost in one eye and greatly impaired in the other. Unilateral blindness is not uncommon as the result of pressure from pituitary tumors, but central vision of the other eye may long remain normal or be only slightly altered. The fact that vision is so markedly diminished in the less affected eye seems to be a characteristic of the chiasmal tumors.

Perimetric observations which were regarded as reliable were possible in only three of the patients. All showed a defect in the temporal half of the field, but in no instance did the hemianopsia show the clean vertical bisection which so often characterizes a pituitary tumor.

Stereoscopic plates of the skull were taken in all but one

[1] Cushing. "Les syndromes hypophysaires au point de vue chirurgical." *Rev. Neurol.*, 1922, xxix., 779–808.

(viz. Case V) of the seven patients. In only one of them (Case II in which the process was not advanced) does the sella as now reviewed appear to us to be within normal limits, though at the time the negatives were first described, those of Case VI were the only ones regarded as sufficiently abnormal to justify special comment. The individual prints accompanying the text show less well than when seen stereoscopically. Few of them happen to have been taken in the perpendicular plane and consequently the accompanying outline sketches have been made for purposes of interpretation (Fig. 42). The peculiar sellar profile of Case VI was what first arrested our attention, and it is now apparent that in Cases I, III, IV, and VII there is a recognizable anterior extension of the fossa which passes like the neck of a gourd under the anterior clinoid processes. This is demarcated from the sella proper by the elevation made by the olivary eminence or tuberculum sellæ. It is more marked in the cases with the fully developed bilateral tumors and appears to be due to a pressure enlargement of the optic foramina.[1] In Case I what is taken to be the outline of the enlarged foramina still retains a faint perceptible shadow of the pillars supporting the anterior clinoid processes which normally gives the radiographic boundary of the sella in profile. In Case III this is lost and in Cases V and VI the absorption has gone on to such an extent, with tilting up of the clinoid processes, as to leave a large space between the clinoids and the tuberculum sellæ when seen in profile. Unfortunately in only one of the fatal cases (Case VI) was a special post-mortem note made of the anterior excavation made by the tumor, and which on lateral radiographic view (Fig. 32) was almost as large as the sella proper.

We may be over-emphasizing this factor as of possible diagnostic value though it is one of the points which gave support to the diagnosis before operation in Case VII. It is a

[1] An examination of the human skull will show that the flat pillars of bone to which anatomists seem to have given no name but which lie to the outer side of the optic foramen, separating it from the sphenoidal fissure, and which support the anterior clinoid processes, would in many cases quickly undergo pressure absorption with tumor distension of the foramen itself, thus throwing on lateral view the two cavities (viz. that of the sella itself and that made by a depressed optic groove and enlarged foramina) into one.

matter which will need further anatomical and radiographic study and may not prove to be confirmed.[1]

Evidences of secondary hypophysial involvement have been inconspicuous, and such as they were they probably have been over-emphasized in the elaborate case histories which we have here so briefly summarized. There is, however, no reason why these secondary manifestations of a local lesion should not appear, for the hypophysial stalk and tuber cinereum are likely to become implicated in all cases in which the growth extends from its original confines, as it seems inevitable that, in time, it should do. A tendency to adiposity was apparent in four of the patients, a slight degree of polyuria and polydipsia in two of them, somnolence and lassitude, which of course are not of great diagnostic value, in two; and loss or lack of hirsutes in two cases. In none of the patients, however, were these symptoms in sufficient evidence to justify the designation of adiposo-genital dystrophy which characterizes advanced grades of pituitary insufficiency.

In view of these things, if one should attempt to make a differential diagnosis of a chiasmal glioma from the more common variety of suprasellar tumor arising from Rathke's pouch, taking into consideration the fact that they are both commonly recognized in childhood, he would cling to the following straws:

Tumor of Craniopharyngeal Pouch	*Tumor of Chiasm*
Primary optic atrophy. In late stages owing to hydrocephalus œdema may be superimposed.	Primary optic atrophy occasionally with tumor involvement of nerve head. Unilateral exophthalmos in advanced cases.
Bitemporal hemianopsia, or if vision lost in one eye, fairly acute vision retained in the seeing half of the other eye.	Acuity low in both eyes with fields showing less typical hemianopic defects.
Process slow, often remaining stationary for long periods.	Process on the whole more rapid and progressive.

[1] So-called pear-shaped sellas unassociated with an optic atrophy are regarded as fairly common, though a review of our negatives makes them appear to be less so than we had supposed. Timme in a recent paper (*Arch. Neurol. and Psychiat.*, 1921, v., 568) reports a similar abnormality in the sella turcica of 23 out of 24 cases of Mongolian idiocy. It evidently has nothing to do with an abnormality of the pituitary body.

Tumor of Craniopharyngeal Pouch.	*Tumor of Chiasm.*
Sella variously deformed, enlarged or normal. Posterior clinoids more affected than anterior. Suprasellar shadows common.	Sella in advanced cases shows apparent extension under anterior clinoids from distension of optic foramina. No suprasellar shadows.
Secondary pituitary manifestations common with adiposo-genital dystrophy and infantilism.	Secondary pituitary manifestations inconspicuous. Cutaneous indications of Von Recklinghausen's disease to be looked for.

Pathology.—In four of the seven cases a post-mortem examination showed a bilaterally symmetrical tumor chiefly involving the chiasm, but tending to invade the opto-peduncular space. The pituitary gland was not involved in any case though its stalk was necessarily distorted as in Case I, where polydipsia and polyuria were observed. In Case III, with adiposity, absence of pubic and axillary hair, the tumor, partially cystic, was of such a size that it must have involved the region of the tuber cinereum. And there were also some signs of early invasion of the gland itself by the growth.

The question naturally arises as to whether these tumors originated in the chiasm itself or in some other structure (optic nerve, optic tracts, posterior perforated substance, hypophysis). It was the operator's impression in Cases II and III (*e.g.*, Figs. 8 and 16) that the process had begun in the intracranial portion of the optic nerve, but the autopsy in Case III belied this impression, for the chiasm was found to be more involved than supposed. In Case I the tumor hardly appeared to extend far into the optic nerves themselves, though on microscopic study they prove to be extensively involved in the process. The gross appearances, indeed, in all the pathological specimens show the tumor to be fairly symmetrical (*e.g.*, Figs. 26 and 33). Though the tumors tend in time to leave their confines and to spread upward behind and above the chiasm into the interpeduncular region of the brain, the evidences are all in favor of their having originated in the chiasm or adjacent nerves even though, as in Case V, the gliomatous process may be found to extend bilaterally as far forward as the optic disk.

The microscopic picture in the seven cases is unmistakably that of a glioma and a complete description is given with each

case report. As is true of gliomas elsewhere in the brain, there is considerable difference not only in the architecture but in the structure of the several tumors. Verhoeff has divided the tumors in his series into three main groups based on the character of the neuroglia. Such a tumor as is shown in Fig. 24 with its vacuolization and cyst formation is doubtless the type often described without justification as myxomatous. The firm tumors shown in Figs. 5, 35, and 40 consist largely of compact masses of glia fibrils and doubtless represent what Hudson preferred to designate as gliomatosis rather than gliomatous tumor. Many of the tumors show an abundance of irregularly shaped masses, which take the neuroglial stain, and which correspond to the so-called "cytoid bodies" of which Verhoeff gives a detailed description. There is no a priori reason why the gliomas of the optic nerve, which embryologically belongs to the diencephalon, should present special formations, and the cytoid bodies, although differently termed, are not infrequently found in gliomas elsewhere. They are usually considered as masses of neuroglia.

Despite all that has been written about them, our knowledge of the gliomata and the tissues from which they spring is very imperfect. It is probable that the studies of the glia made by Ramón y Cajal and his pupils, of which as yet we know but too little, will throw a new light on these tumors which probably arise from glia cells of different types which we will some day be able to differentiate. The least we can do at present is to designate as glioma those tumors of the central nervous system which show glia fibrils with proper selective stains.

Treatment.—Unquestionably if we may come in time to perfect our clinical diagnosis of these lesions there is every reason to avoid operating upon them, though in cases of doubt an exploration may have to be made. One might suppose from the unhappy outcome of three of the operations in this series, that these explorations are associated with unusual risk of a fatality from hyperthermia. Although there is an hypothetical center in the tuber cinereum which presumably is heat regulatory in its function, we incline to the belief that the fatalities in this series were coincidental, because of the fact that much more serious operations conducted in this region

for the removal of pharyngeal pouch tumors, and which unquestionably traumatize the floor of the third ventricle, are attended with a very low mortality. In one of the fatal cases, moreover, no attempt was made to remove the lesion and in another the fatality followed a subtemporal decompression, which could hardly have produced such a dislocation of the tumor as to disturb the thermo-regulatory center.

Whether one would be justified in making a complete removal of the chiasm involved in one of these lesions, should it chance to be exposed at an early stage of the process and before the growth had spread (as in Case II) is doubtful. We venture to express this feeling in spite of the favorable prognosis given by ophthalmic surgeons in cases in which a large glioma has been removed with the orbital portion of the nerve. Treatment by radium or the X-ray, though far from encouraging, in our present stage of understanding of the therapeutic possibilities of deep radiation, is probably our best hope, but final judgment on these matters must be deferred.

Conclusions.—One consideration certainly will be of interest to ophthalmologists, namely that we have here another explanation for some of the obscure cases of primary optic atrophy so often attributed to a retrobulbar neuritis. They will promptly recognize that we have dealt in this paper with a lesion already familiar to them, though largely when the process of tumefaction within one orbit has reached such a size that exophthalmos results.

It is quite possible that we will all, ophthalmologists, neurologists, and neuro-surgeons, come to recognize these lesions with sufficient accuracy to permit us either to avoid operation altogether, or at least to know better with what sort of a lesion we will have to deal before its surgical exposure.

Certainly a primary atrophy in cases of generalized neurofibromatosis, or even those with slight manifestations of this malady will rest under suspicion of having a gliomatous process in the chiasm or its adjacent nerves. Suspicion will also be aroused when there is an obvious swelling of an atrophic nerve-head without evidence of increased intracranial tension.

But even in the absence of these tell-tales of the process when a primary atrophy of the nerves in young people is

associated with the peculiar sellar deformation which has been described, and without the shadows usually cast by the more common tumors of this region in childhood, one may well consider the possibility that the symptoms are due to a primary glioma of the chiasm.

FUNDAMENTAL CONSIDERATIONS IN THE CORRECTION OF SQUINT.

By Dr. ARTHUR WHITMIRE, New Orleans.

(With three illustrations on Text-Plate XXVII.)

THE entire eradication of the trouble transforms the child. The relief from discomfort and his improvement in appearance are a liberation from criticism and conspicuousness, for in seeking to treat such a case, cosmetics is a factor to be considered of first importance.

The facial expression is changed at once. The child becomes confident and happy. The relief that comes from discarding glasses enables him to engage in out-door sports, his general health is improved, and the once miserable little fellow has an equal chance with others. The shrinking, bashful misfit and weakling, headed for failure, is given a right about toward a square deal in life.

For the sake of clear presentation of the means by which squint is corrected we shall briefly review the nature and cause of the defect, offering nothing new in the description.

Squint is a deviation of the eyes, either one or both, from the proper position. It results in double vision which is more pronounced in the beginning of the affection than it is later. Double vision even disappears in most instances for the simple reason that the child learns to disregard the image in the squinting eye. The vision of the deviating eye (unless it be of the alternating character) is gradually lessened in acuity. An amblyopia exanopsia takes place. This condition is nearly always occasioned by the hyperopia of children remaining uncorrected.

An effort to accommodate provokes convergence in propor-

ILLUSTRATING DR. A. WHITMIRE'S ARTICLE ON "FUNDAMENTAL CONSIDERATIONS IN THE CORRECTION OF SQUINT."

FIG. 1.

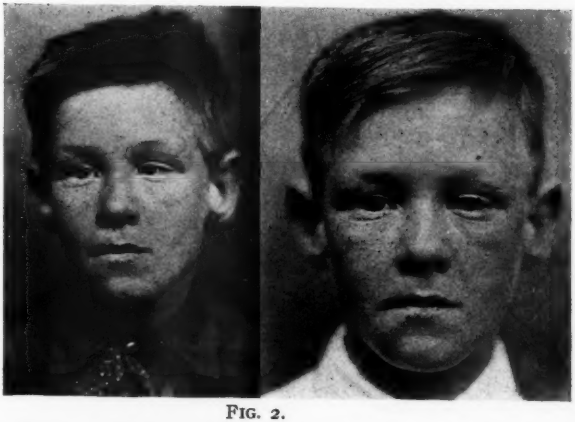


FIG. 2.

FIG. 3.

tion to the impulse. Uncorrected errors beginning in children, usually between the second and fifth year, often result in a permanent deviation of the eye. And yet, it is a condition quite easily corrected by prescribing glasses in a vast majority of the cases. The remaining percentage may be corrected by resection and tenotomy, if they present for treatment before the visual acuity has degenerated below the ability to count fingers at short distances.

Fuchs (1) mentions the non-accommodative variety of convergent insufficiency which develops with reference to refractive error. Cases developing before the first year are usually due to congenital malformation, and these should be classified as paralytic squint.

Accommodation squint develops from a periodic one, noticed only when looking at objects near at hand. Later the squint is present when looking at distant objects and finally it becomes continuous.

Occasionally a squint will disappear when the child reaches puberty, but it is a great mistake to count on the defect being *outgrown*. While waiting for it to be corrected by Nature, the sight suffers from lack of development and this loss cannot be recovered. Squint which corrects itself is *pseudo-squint*.

Divergent strabismus may be almost outgrown but returns as one grows older. Slight degrees of deviation are usually more distressing to the patient than those more pronounced, because the image of the squinting eye is quite distinct and cannot be ignored. In squint resulting from wide deviation, the image is so blurred and so far removed from the image of the normal eye that it is hardly in the patient's consciousness at all and there are no reflex disturbances which are so annoying as when the double images are distinct.

Strabismus, to give the technical name to squint, is mentioned in the earliest medical writings. It was not until the nineteenth century, however, that the way to surgical treatment of strabismus was opened by research on the anatomy and physiology of the nerves and muscles of the eye. When the structure of the eye and the function of its muscles became known, a period of actual discovery in means of surgical correction followed.

Donders, (2) during the latter half of the nineteenth cen-

tury, contributed to the ætiology of strabismus the following facts: (a) *strabismus convergens* almost always depends upon hypermetropia; (b) *strabismus divergens* is usually the result of myopia.

The most important contribution to the study of strabismus in the last half of the nineteenth century was the addition to the stock of anatomical knowledge of the muscles and their insertions and a deeper insight into their functional relationships.

The operations at that time consisted of two steps: (a) tenotomy or setting back of the tendon of the deviating muscle; and (b) advancement of the antagonistic muscle.

The disadvantage of these methods is that only one eye is operated upon at a time. Now, functional strabismus is bilateral and both eyes should be operated on at the same time when it is possible. This last method of operating by one intervention is the contribution to the correction of squint offered by Panas (3).

The twentieth century has seen a marked departure from the accepted theories of the previous generation. The belief that amblyopia exists from birth and is one of the *causes* of the deviation has been changed; most ophthalmologists at present are of the opinion that amblyopia exanopsia is produced as a *result* of squint and that it is not concerned in causation.

Wootton (4) does not uphold this reversal of opinion and still regards amblyopia as congenital and ætiological in squint. He is furthermore of the opinion that the importance of binocular single vision has been rather overestimated. Even when there is no amblyopia present in the squinting eye, Wootton regards the single or double tenotomy as the best operation. When the squinting eye has vision of $\frac{20}{10}$, when the globes are fairly prominent, when the technic is perfect and the operation does not leave noticeable disfigurement, Wootton recommends advancement of both externi, as advocated by Landolt (5).

A signal change came in the attitude of ophthalmologists toward the ætiology of squint with the reports of Claude Worth (6) upon his investigations of the *fusion sense*. This refers causes to the visuomotor centers; that is, strabismus is the outward expression of a lack of coördination in the visual

apparatus. Coördination refers to the relation between the mind and the body. The factors that predispose to strabismus are two: (a) a *central defect*, some degree of arrest or embarrassment in the fusion faculty (visuomotor centers); plus (b) a peripheral defect, represented by a refraction error that only serves to aggravate the innervational disturbances already present. Other factors are anatomical anomalies (usually congenital), opacities in the media, and low-grade central choroidoretinal lesions.

Reber (7) believes that the two important measures in non-operative treatment consists of an initial correction of the refractive error and a final cultivation of binocular single vision. He is of the opinion that operative treatment should be postponed, as a rule, until the ninth or tenth year.

Reber's methods of non-operative treatment are interesting and are here briefly described: The angle of deviation is first determined, and for this purpose the linear method of Graefe is utilized. To determine the refractive status, Reber advocated atropia and retinoscopy, working at twenty inches and holding the lenses in the hand before the eye. After accurate refraction, the real treatment only just begins. Accommodation is prevented by the daily morning use of a drop of two grains to the ounce of atropine solution dropped into each eye, for three months after the correction has been put on the patient. In addition, invisible bifocals, after the suggestion of Linn Emerson (8) are ordered. A plus 3.00 sphere added to the distance correction is worn in the lower segment for a year, thus keeping the accommodation completely at rest. The following year this is reduced to plus 2.00 sphere, after another year to plus 1.00 sphere, and, finally, in another year the distance correction only is worn.

Immediately following this, the cultivation of the dormant fusion faculty is begun. "In the true alternating type of strabismus this will no doubt prove unavailing, and this type constitutes the one exception to the rule which provides that esotropic children should not be operated on before the ninth or tenth year. The two other types, namely incomplete binocular and complete monocular esotropia, are the relatively frequent ones and are susceptible to fusion training" (7).

Worth's amblyoscope pictures are so arranged as to train

fusion sense through three grades of binocular vision; (a) simultaneous macular perception, (b) true fusion with some amplitude, and (c) sense of perspective. "The non-operative treatment of strabismus when successful," writes Reber, "achieves a perfectness and a beauty of result seldom accomplished with the scissors (that is, straight eyes with full binocular vision), while even if it fails at this ideal result, it furnishes the ideal preparation for operation, in that it reduces the amount of operative work that may be necessary in any case and offers to the surgeon greater certainty and hope of a favorable operative result, if this becomes necessary" (7).

Hansell (9) curtly expresses the opinion that non-operative measures should be tried first, and sufficient time allowed to prove their uselessness before operation is decided upon. In esophoria he advises operation if asthenopia persists beyond the point of cure by medicinal and optical measures. This operation should be double tenotomy, subconjunctivally, with due regard for the effect of the division of each fiber, resting when an over-effect of two or four degrees is obtained. Both operations should be done at one sitting under local anæsthesia. In esotropia, the best results are obtained by double external advancement, provided that a divergence of ten or fifteen degrees is first secured at the time of operation and the eyes are bandaged for three days. The patient should wear a full or nearly full correction, and remain under observation. Amblyopia which is always present in the squinting eye is congenital and cannot be more than slightly improved by the methods in general use. The purpose of the operation can be only cosmetic.

Dunnington (10) has a theory that the existence of divergence is a function distinct from external rotation, and that convergence is not simply an act of internal rotation but that it is a distinct entity; that is, the performance of these movements is controlled by cerebral centers. The purpose of the two operative procedures in general use are two: (a) the weakening of an over-acting muscle; (b) the strengthening of an underacting muscle. To increase the action of a weakened muscle the following procedures are resorted to: (a) the tendon can be shortened or resected; (b) the insertion of the

muscle can be carried further forward (near the limbus). In squints of long standing it is frequently necessary to combine a resection of one muscle with a tenotomy of its antagonist. The belief that squint can be outgrown or that it corrects itself is based upon the fact that pseudo-squint is a common condition.

Delogé (11) finds (as my article fully demonstrates) that there is a wide diversity of opinion both as to the nature and the treatment of strabismus. I may remark parenthetically and before continuing to discuss the theories of Delogé that *where doctors disagree there is, without doubt, some central truth which has either been but faintly perceived or else not discovered at all.* In the case of strabismus the theories are still in an evolutionary state. Delogé, for example, states that a strabismus was for some time, during the evolution of theories, regarded as of muscular origin, thereby confounding it with deviation or squinting, which is an important symptom, although neither characteristic, nor always present. For *convergent strabismus* Delogé urges reëducation of the binocular vision as an essential feature. In *divergent strabimus*, he is of the opinion that orthoptic treatment ensures the most rapid and brilliant result.

It is the more recent knowledge we have in regard to the nature and treatment of squint that interests us here and we have seen how widely opinion varies. But to me it seems that two conclusions are inevitable: (a) anomalies of this character in vision should be first corrected by refraction if possible. This is sufficient in many cases in which deviation is of the periodic variety. If a convergent squint is beginning to develop in a hyperope, all the hyperopia should be corrected, with a small deduction of astigmatism (if excessive) in those who have never worn glasses. (b) Operation is a last resort and the relief it affords is in most instances simply cosmetic. And relief from disfigurement is often what the patient most desires. With the foregoing considerations before him the author addressed himself to the development of an operation that he hoped might be relied upon to effect cosmetic correction, even where it could not hope to improve vision.

It seemed to him from the mechanics of the eye that where operative interference was indicated a resection or tenotomy

alone was insufficient in every case to enable one to discontinue wearing glasses without detection of defect or discomfort. A resection of a frail undeveloped muscle, handicapped already in that its antagonist is two to three times stronger in muscle strength, is unscientific and unpardonable without a total tenotomy, the readjustment of which preventing not the least bit of exophthalmus, sinking of caruncle, or feebleness of motion, while looking in all extreme directions.

The cases of divergent strabismus often have a weakened, thinned, and undeveloped internus and a hypertrophied externus. In the divergent cases only one eye as yet has been operated. Resection of externus and tenotomy of internus is done, but more convergence is made with anchor which is passed through Tenon's capsule three *mm* from outer limbus and made fast to nose with adhesive strip. My (2) modification of Reese's resection is to pass a No. 10 silk suture into the muscle proximal to the Prince Forceps, but not until the tendon has been divided at the scleral attachment, just the opposite procedure to that of Reese, but causing the severed edges of both stump and muscle not only to come together but actually bend at right angles to plane of sclera with their cut ends pointing outward. Not one of the thirty-two cases showing any tendency to slip or relax in the least from underneath the stump. Sutures are passed through conjunctiva and two *mm* from limbus and tied securely. The tenotomized muscle is held in Prince Forceps and a number five (5) silk suture passed through muscle proximally to forceps and into sclera from three to twelve *mm* from stump and brought out and ties over conjunctiva two *mm* from limbus. Done by the open method, it is necessary to close all conjunctiva openings with No. 5 silk. Anchor either to bridge of nose over several layers of adhesive, or strap over to temple as the case may justify. This anchorage is best obtained by passing a number 13 silk suture underneath the conjunctiva as close to limbus as possible. Pressure bandage over both eyes, changed every twenty-four hours for three consecutive days. Keep anchor taut until removal on the fourth day. Large scleral sutures should remain in position from twelve to thirty days owing to the amount of scar desirable at attachment.

Local anæsthesia is used for all cases except the excitable

type. The youngest operated in series under local was six years of age. No interruption on account of pain.

No. 1. January 10, 1920. J. C., 16 years. (Figure 1.) R. $\frac{20}{30}$, L. $\frac{20}{20}$.

History.—R. Eye turned outwards since eight years of age. Headaches.

Refraction.—OU − 0.5 C 90 AU = $\frac{20}{20}$. Status. Divergent Strabismus 35°. Muscle Strength. Total Convergence 30° feeble in action. Total Divergence 45°.

No. 3. Jan. 24, 1921. E. L., 11 years. R. $\frac{20}{70}$ + 4.0 Sph. $\frac{20}{20}$. L. $\frac{10}{200}$ + 5.0 Sph. $\frac{20}{200}$.

History.—Since two years of age L. eye crossed to nose. Can't see well to study. Status: Convergent Strabismus 20°. Muscle Strength. Total Convergence 50°. Total Divergence 40°.

No. 4. May 3, 1921. E. B., 8 years. R. $\frac{20}{50}$ + 4 Sph. $\frac{20}{30}$; L. $\frac{20}{200}$ + 6 Sph. $\frac{20}{200}$.

History.—L. eye crossed to nose since baby. Status: Convergent Strabismus 40°. Muscle Strength. Total Convergence 55°. Total Divergence 35°.

No. 5. Oct. 22, 1921. Geo. G., 13 years. R. $\frac{20}{100}$ + 5.0 = 0.5 C 90 $\frac{20}{100}$. L. $\frac{20}{20}$ + 3.0 = 0.5 C 90 $\frac{20}{20}$.

History.—R. eye crossed to nose since three years of age.

Status: Convergent Strabismus 50°. Muscle Strength. Total Convergence 55°. Total Divergence 35°.

No. 7. August 21, 1921. C. B., 12 years. R. $\frac{20}{200}$ + 5.5 $\frac{20}{20}$. L. $\frac{20}{20}$ + 5.5 $\frac{20}{20}$.

History.—Since two and a half years of age R. eye crossed to nose. Got tired easily in school.

Status: Convergent Strabismus 35°. Muscle Strength. Total Convergence 50°. Total Divergence 40°.

No. 8. Dec. 21, 1921. S. J. S., 20 years. (Figure 3.). R. $\frac{6}{60}$ + 2.5 Sph. = $\frac{6}{6}$. L. 5.6 + 0.5 Sph. = $\frac{6}{6}$.

History.—Right Eye crossed to nose since baby.

Status: Convergent Strabismus 45°. Muscle Strength. Total Convergence 55°. Total Divergence 30°.

SUMMARY

In all cases thus far operated:

1. Glasses have been discarded altogether.

2. The final results have been such that it could not be discerned that the eye had ever sustained any deviation of musculature.

3. There has developed no tendency to recur.

4. The strain on convergence incident to accommodation has not asserted itself, even when the error of refraction is considerable and left incorrected.

5. Synchronism is maintained even when the vision in the squinting eye is reduced as low as "fingers at two feet" and it is believed that full cosmetic correction can be had even in the absence of light perception.

6. Most patients have taken on a happier mien and several have gained ten to twenty pounds in the few weeks following the operation. After a few months all discoloration and scars of conjunctiva have vanished. Increase in weight and body strength enabled patient to accommodate without discomfort in hypermetropia up to four and five.

Except for a few days following operation double vision is not noticeable, especially in the convergent type, no noticeable exophthalmus has followed this operation.

7. Several cases under observation at present including some of the first operated since three years ago are improving with age.

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A CASE OF ORBITAL ABSCESS PRODUCING A CLINICAL PICTURE OF SEPARATION OF THE RETINA. PATHOLOGICAL FINDINGS, INCLUDING AN ANÆMIC INFARCT OF THE OPTIC NERVE.

By Dr. ROBERT CARTWRIGHT CHENEY, Boston, Mass.

(From Massachusetts Charitable Eye and Ear Infirmary.)

(*With two illustrations on Text-Plate XXVIII.*)

Case: On August 25, 1921, a well-developed and nourished boy of ten years came to the Infirmary and was admitted to Dr. G. S. Derby's service with a tentative diagnosis of an abscess of the right orbit. The history and clinical findings were as follows:

Family History.—Father living and well—very deaf and myopic. Eight children living and well.

Past History.—The only infectious disease that the patient has had is diphtheria, five years ago. Eyes negative until present illness. Sight good. Ears—otitis media two years ago. Throat—negative. Nose—no history of discharge, colds, etc. Teeth—negative. Gastro-intestinal—appetite fair—no vomiting except as noted below. Bowels regular. Cardio-respiratory—no cough; dyspnea; precardial pain; palpitation or œdema. Neuro-muscular negative. No chorea; rheumatism, etc. General condition good up to present illness. Skin—subject to boils.

Present Illness.—Began about six weeks ago with headache located in the right temporal region. Has had dull pain in and about right eye, which was severe enough to keep him awake. Radiated at times to right parietal region. Patient thinks vision has failed gradually in right eye. Slowly increasing exophthalmos during the past week. No fever noted. No cold in head or nasal discharge. Patient vomited one time after riding in street car one week ago. Patient has been drowsy during entire illness and father has noticed a slow pulse—about 60. Condition getting

ILLUSTRATING DR. ROBERT C. CHENEY'S ARTICLE ON "A CASE OF ORBITAL ABSCESS, PRODUCING A CLINICAL PICTURE OF SEPARATION OF THE RETINA."

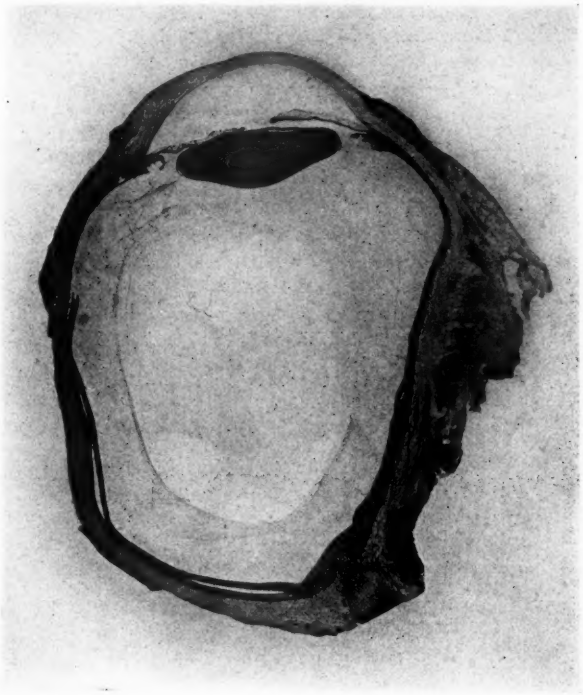

FIG. 1.—Cross section of globe, nasal wall of which is pressed in by abscess. Thickened choroid. Infarct of optic nerve.

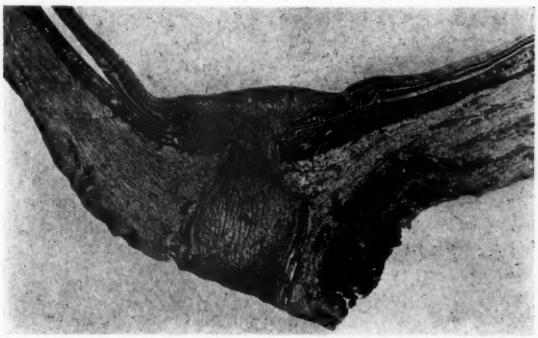

FIG. 2.—(Low power) Infarct of optic nerve.

progressively worse. Patient seen by oculist who made a diagnosis of tumor of orbit and referred him to Eye and Ear Infirmary where he arrived this evening.

Physical Examination.—Right eye: Lids and lacrimal apparatus normal. There is a marked exophthalmos, the eye being shoved somewhat downward—with marked limitation of motion in all directions. Conjunctiva—slightly injected and only slightly chemotic. The cornea is clear. Anterior chamber fairly good depth—pupil widely dilated—does not react to light or accommodation (atropine). Iris—normal in appearance. The media are clear. The fundus shows greatly engorged and tortuous veins with an apparent separation of the whole nasal ½ of the retina, which is grayish-white with typical wrinkling, etc., coming up from the disk, in an absolutely perpendicular manner. The separated surface being parallel to optic axis. This apparent separation is not mobile and does not transilluminate at all. Rare hemorrhages on surface. The remainder of the fundus showed a slight but perfectly definite œdema of the retina. Tension *12mm.* Vision nil.

Left Eye: Lids and lacrimal apparatus normal. Conjunctiva white and quiet. Cornea clear. Pupil widely dilated. Does not react to light or accommodation (atropine). Media clear. Fundus normal. Tension *20mm.* Vision $\frac{20}{20}$.

August 26. To-day X-ray report was the following: "Right antrum very much clouded—pus. Rest of sinuses clear." The chemosis is more marked—the eye pushed down and out and a preauricular gland noticed. White blood count 25,000. Temperature 101.8. On the strength of the above findings the process was considered to be an infection, with pus in the orbit, probably originating from a sinus. Operation, in conjunction with a rhinologist was decided upon and performed in the following manner:

Operation.—Exploration of antrum, inner portion or orbit and ethmoid region (on right side). Enucleation right eye. Patient recumbent—head slightly raised. Post-nasal plug inserted. Face sponged with alcohol and draped. Large gauze sponge packed into right side of mouth. Ether administered via vaporizer held in right side of mouth.

1. With upper lip pulled upward, incision 2 in. long, horizontal, made through gingivo-labial fold of mucosa of right upper jaw. Periosteum scraped upward and downward. Mallet and chisel followed by bone forceps used to break open and enlarge opening into right antrum. Small amount of thick secretion found in antrum—antral walls everywhere intact and healthy. Nasoantral wall not opened. Gauze pack inserted into antrum.

2. Curved incision 2 in. long made through skin and periosteum of upper part of right side of nose. Periosteum retracted. Free hemorrhage checked by hæmostats. Periosteum of whole of inner wall of orbit and of about ⅓ of roof of orbit elevated—easily. No evidence discovered of any disease of bone so exposed. Mallet and chisel and bone forceps used to open right side of nose, through opening so formed ethmoidal cells curetted. No evidence of pus or polypoid material. Nasal skin wound closed by four interrupted sutures. Ligatures previously tied around two bleeding points. Skin wound dusted.

A small incision made in the conjunctiva at inner limbus at about 2 o'clock. Conjunctiva which was thickened, friable, and infiltrated, dissected up. Tenon's capsule adherent to globe. Probe inserted along inner part of globe and dark yellow pus obtained. It was then decided to enucleate which was done with great difficulty as the whole inner half of the globe was adherent to Tenon's capsule and orbital tissue. A good deal of pus obtained—which came from inner part of orbit. Practically no bleeding. Tissues infiltrated and friable in inner part of orbit.

August 27. Wounds clean; moderate amount of chemosis and swelling. General condition excellent. No pain. Culture—taken at time of operation—shows profuse growth of staphylococcus aureus. Wassermann negative.

September 8. After uneventful convalescence patient was discharged to Out-Patient Department. Socket well healed. Wound in skin on nose healed.

Thus there remained two obscure points to be explained.

(1) The peculiar separation of the retina which did not transilluminate.

(2) Complete loss of vision in the affected eye, light perception even absent.

I am greatly indebted to Dr. F. H. Verhoeff for the pathological findings and the photomicrographs.

Pathological Diagnosis.—Orbital abscess. Compression of globe. Chronic inflammatory infiltration of sclera and choroid. Anæmic infarct of optic nerve behind lamina cribrosa. Marked papillœdema.

The globe is distorted, the nasal wall from the disk to a point somewhat anterior to the equator being pushed in, evidently by pressure of the abscess. In this situation the sclera is thickened to about 1*mm* and moderately infiltrated

with pus cells. The scleral vessels are giving rise to actively proliferating capillaries. From the external surface of the sclera there is an active formation of granulation tissue richly infiltrated with pus cells and here and there containing dense foci of pus cells. In these foci the Gram stain shows numerous groups of staphylococci. The choroid contiguous with this part of the sclera is markedly congested and densely infiltrated with lymphocytes. The dilated veins contain numerous pus cells which are usually massed along their walls but there are almost no pus cells in the stroma of the choroid. The suprachoroidea shows marked proliferation of its fixed cells. As a result of this chronic inflammatory reaction the choroid is ½*mm* thick. The choroidal involvement gradually fades out anteriorly and almost disappears at the ora serrata, although the ciliary body on the nasal side shows an appreciable infiltration with lymphoid cells. The involvement continues on the temporal side in diminishing degree to about the equator. The sub-choroidal space is not distended at the fundus, but on both sides shows slight distention with serum in the vicinity of the ora serrata, the distention being greatest on the temporal side. The retina is everywhere in situ. It is greatly congested and shows an occasional small hemorrhage, but is free from œdema and cellular infiltration. The optic disk is swollen 1*mm* but is free from cellular infiltration. Its vessels show active proliferation with formation of new capillaries. There are interstitial hemorrhages beneath the surface of the disk. Just behind the lamina cribrosa the optic nerve shows an area of necrosis. This occupies almost exactly the upper half of the nerve, the central vessels, however, escaping, and extends backward 1¼*mm* from the lamina. This area stains much more strongly in eosin than the normal nerve, and within it all nerve tissue is in the process of disintegration. The nuclei all show necrosis in various stages, as manifested by pycknosis, fragmentation and karyolysis. The area is free from cellular infiltration. Posteriorly many engorged capillaries may be seen extending a short distance into the area. On the nasal side granulation tissue is beginning to invade it from the pia and sclera. One half *mm* behind the area of necrosis, the nerve as seen in cross sections stained in hæmatoxylin and eosin, appears absolutely normal. The central

vessels, examined in serial cross sections, are engorged, but otherwise normal.

The cornea, iris, and lens are normal. The canal of Schlemm is distended with blood on both sides. On the temporal side the ciliary body is normal. On the nasal side it is greatly congested and slightly infiltrated with lymphoid cells in its muscular portion.

The above report explains the clinical findings. The globe was forcibly compressed between the outer bony wall of the orbit and the abscess situated nasally. The force was sufficient to press in the nasal ½ of globe almost to the center line and the choroid of this region densely infiltrated, seen through the transparent retina, gave the clinical appearance which was mistaken for a separation of the retina.

Now the most interesting feature, which might account for the total absence of light perception, was the infarct of the optic nerve. A review of the literature was made but no similar case accompanied by a pathological examination could be found.

There are many cases reported of optic atrophy following abscess of the lacrimal sac, orbital phlegmon, etc., H. Villard (1), Jean Galezowski (2), Truc (3), Boyd (4). Elschnig (5), mentions an inflammatory thrombosis of vessels of the optic nerve in inflammations of the orbit. No microscopic findings were described. Birch-Hirschfeld (6) in speaking of changes in the optic nerve in orbital processes, mentions two cases, one of orbital phlegmon in which sections of the optic nerve showed an infiltrating, interstitial neuritis, lymphocytes and leucocytes being present in the optic nerve, the other, also a case of orbital inflammation in which the damage to the optic nerve was merely by mechanical means. Sourdille (7) investigated a case of orbital phlegmon where the nerve showed obliteration of the central vessels through proliferation of the intima. In these areas of proliferation numerous streptococci were demonstrable. Bull (8) reports a case of orbital phlegmon, in which the optic nerve showed evidence of an intensive neuritis, with a few nerve fibers intact in the central part of the optic nerve, the greater part of which, however, had been replaced by organized inflammatory tissue.

Thus the above are some of the pathological findings in the

optic nerve found in cases of orbital inflammation. Our findings were in no way similar to any of these. The optic nerve showed an anæmic infarct, very discreet and well localized with absolutely no inflammatory cell infiltration, the absence of which, of course, precludes any question of septic embolus.

The question now arises as to which vessels supply this portion of the optic nerve immediately back of the lamina cribrosa. According to Parsons (9) the optic nerve from the place of entrance of the central vessels to the lamina cribrosa is supplied by perforating branches of the vessels in the sheathes of the nerve, and also by branches from the central vessels; Salzman (10) speaks of the central vessels giving off a few branches, mostly veins in the optic nerve trunk, he states that the central artery gives off a large number of fine branches only at the lamina cribrosa and considers the part of the central artery in supplying the optic nerve to be a minor one. Therefore, also considering that the central vessels were normal in our sections it seems obvious that the vessels, whose involvement caused the infarct, must have those coursing in the pial sheath of the nerve. These vessels according to Parsons (9) are derived from the pia mater of the brain, reinforced by inconstant branches of the ophthalmic artery.

As to the origin of the infarct of the optic nerve, it seems probable that the vessels which supplied the involved portion of the optic nerve were obliterated either by septic thrombosis or by toxins from the inflammatory process. Considering that the abscess extended well back to the posterior pole of the eye, and the region of the optic nerve, this view appears quite tenable. Now the question arises as to whether the infarct of only half the nerve would account for the total loss of vision. Dr. Verhoeff believes that the toxic products of the infarcted area were sufficient to destroy the functional power of the remainder of the nerve. This theory seems perfectly plausible, but, as only a relatively small portion of the nerve was obtained for examination, there is no way of proving whether or not there was also some inflammatory or toxic involvement of the optic nerve further back in the orbit, although this is unlikely from the fact that abscess was immediately behind the globe and the portion of the nerve examined was free from inflammation, although the nearest to the abscess.

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CASE RECORDS IN OPHTHALMOLOGICAL CLINICS.[1]

By Dr. CONRAD BERENS, Jr., and Dr. GERTRUDE E. STURGES, New York.

THERE is considerable published material on the value of complete and accurate medical records in hospitals, but the discussion of out-patient department records is a neglected field. The dearth of published material regarding the desirability of good dispensary records is due, no doubt, to a general lack of appreciation of the significance of the out-patient department, both in its relation to the hospital and to the community. The more recent consideration of the importance of the dispensary forces recognition of the necessity of not only improving the service in this department, but of keeping better records of service.

The literature on hospital records presents many convincing arguments why complete medical histories are essential. Mr. J. G. Bowman, of the American College of Surgeons, in an article on "Case Records and Their Use" (1) asks the question: "What element are the records in the success of a hospital? If case records are essential to good hospital service, just why are they essential?" And his comprehensive answer applies to dispensaries just as forcibly as to hospitals: "The hospital exists for the patient. Let us assume that the hospital seeks to give worthy service to every man, woman and child admitted to its care; that in return it seeks the confidence, goodwill and even the financial aid of its community. Rational and convincing evidence as to the hospital's service is wanted by the public—because of its very importance the hospital is

[1] Read before Section on Ophthalmology, New York Academy of Medicine, December 18, 1922.

under fire of criticism. In some practical fashion it must account for efficient performance in every department. How shall the hospital make this accounting? Well, results are what count, and results are to be found in case records. Facts, facts, facts in the relevant personal history of each case, facts developed in the physical findings, facts brought to light by the laboratories and X-ray, facts deduced through pliable wisdom from all of these and expressed as diagnoses—these are the foundation of the hospital or clinic. Unless the hospital as a matter of institutional policy is in possession of these facts, filed in orderly fashion in justification of its work, it is entitled to little credit in its community or in the medical profession. . . . A good record consists only of such facts as will be of worth to the patient in the study and treatment of the case; and to the profession for its information in the treatment of similar cases in the future."

Another strong plea is made for good records by J. M. Baldy, Commissioner of Public Welfare of Pennsylvania, in an article, "Meaning of Case Records" (2). He states that the records are educational to other physicians and to nurses as well as to the attending clinician. "Further, they are educational to the board of managers as well as to their agent, the superintendent. They are a protection to the institution against suits for damage. They are an assurance to the patient of proper treatment. They are an assurance to the public who contribute to the support of the hospital that their money is being properly and helpfully expended. Case records not only demonstrate whether or not the physician is giving proper attention to thorough-going and exhaustive diagnoses but actually secure this most desirable result by creating the consciousness of an open record which is regularly checked up. Last but not least they are most helpful, through potential research, in the advancement of medical knowledge and therefore useful to the whole world."

There seems to be no lack of evidence on the value of good case records. The reasons for keeping clinical records are briefly summarized by the Committee on Hospital Forms and Records of the American Hospital Association as follows (3):

"1. To show at any later date an accurate record of the professional measures instituted in any given case.

"2. To provide a basis for the analysis of the work of attending physicians and surgeons.

"3. To provide a basis for research and study in medical practice.

"4. To provide a means of instructing medical students in the proper method of making a diagnosis.

"5. To provide the attending staff with a written record of the patient's progress.

"6. To enable the hospital to fulfill its obligation to the patient in providing such record upon request.

"7. To provide a basis for legal evidence if needed.

"8. To stimulate adequate and competent service on the part of the attending physicians and surgeons."

Considerable effort has been made during recent years by the American College of Surgeons, the American Medical Association, the American Hospital Association, etc., towards the improvement of hospital records. The Public Health Committee of the New York Academy of Medicine in its study of dispensaries in 1918 demonstrated the need for better out-patient records and made many valuable suggestions for improvement (4).

Under the direction of the Section on Ophthalmology of the Associated Out-Patient Clinics of New York we recently made a study of five hundred medical histories, 50 from each of ten representative ophthalmological institutions in New York City. This study clearly demonstrated the deficiencies of present methods of record keeping. Only three of the institutions attempt a routine method of history taking. In the other institutions each man follows his own method, which, from the data recorded on the medical records, is usually decidedly unsatisfactory. Of the five hundred records analyzed, history was recorded in only 55%; a tentative or final diagnosis in 68%; treatment in 76%; vision in 78%; refraction in 45%; muscle examination in .44%.

The proportions given above do not indicate the total inadequacy of the records in some institutions. In one clinic 68% of the histories presented neither tentative nor final diagnosis; in one institution 92% of the records showed no history; the treatment instituted was not recorded for 47%

of the medical histories in another clinic, and vision was noted on only half and refraction on one quarter of the records in still another institution. We will all agree that such medical histories fall lamentably short of meeting the requirements stated previously. They obviously do not provide a satisfactory record of "previous professional methods instituted" to guide the physician treating the patient at a later date. We physicians who are responsible for these records should not care to have them used by the trustees as "a basis for the analysis for the work of attending physicians and surgeons." As a basis for legal evidence, our records would be of dubious value. As a "basis for research and study in medical practice" or as a means of instructing medical students, such records are practically worthless. In fact only one clinic of those visited makes their histories available for teaching and study by a system of cross indexing interesting cases by disease.

The fundamental importance of reliable case records being granted and the existing practice as we have studied it in our representative institutions having been found exceedingly defective, we believe that the physicians who are interested in improving conditions for themselves and in rendering better service to patients should agree upon the elements of a satisfactory record system and make every effort towards having these principles put into effect in our clinics.

We suggest the following principles of record keeping for your comment and criticism:

I. Each clinic should adopt definite standards for the content of records.
II. Responsibility should be fixed for the supervision of records: for their accuracy, completeness and proper care.
III. All records should be filed centrally.
IV. All the records of each patient should be filed together.
V. The records of the in-patient and the out-patient department should be unified as completely as possible.

I. Standards for the content of records should provide for all the information necessary to the proper understanding of the physical condition and the social problems of the patient,

and adequate notes on the care and disposition of the case. Such standards should include the following:

1. Identifying information, etc., *i.e.*, name, address, age, sex, nationality, occupation, habits, social condition, heredity, name of friend or relative, name of physician treating patient.
2. Patient's history.
3. Findings on physical examination.
4. Results of laboratory tests, X-ray examinations, or other special tests.
5. Provisional or final diagnosis.
6. Treatment, including reference to hospital social service or other reference.
7. Progress and results.

II. Unless someone is charged with the responsibility of seeing that records are accurately and completely filled out and properly filed, the adoption of any standards for content of records will prove futile. Records should be systematically and carefully reviewed to determine whether they meet the specified requirements. In some institutions the members of the medical staff rotate in assuming this responsibility for their respective services, reporting results both to individual physicians, and at clinical conferences. In other clinics this duty devolves on the nurse in charge or a specially trained secretary. It seems more fitting to have defects in records brought to the attention of physicians by their colleagues rather than by a nurse or secretary. The actual review of records, which involves considerable detail work, may well be done by some member of the staff who is not a physician.

III. In order that there may be central responsibility for the completeness of records, all records must be filed in a single place, not in individual clinic rooms. Such central filing also makes possible the combination of all information about a single patient, as provided for later; central responsibility for filing; a central alphabetical file for identification purposes; and a central diagnostic file.

IV. All records of each patient should be filed together in a single place, that is, all information about John Smith, who may be attending two or more clinics, and also be under the

care of the social service department, should be incorporated in a single record, or at least the various records filed in a single folder. The value of such centralization of information is at once apparent to any physician who has been responsible for the care of patients who are also being treated in another department. Each department is without definite information of the findings or treatment of the other unless a strenuous effort is made to secure such information.

V. The unification of in- and out-patient records is really only the complete application of the previously stated principle providing that all information about each patient should be filed in a single place.

Many factors are involved in the application of the above stated principles, most of which require the coöperation of the administration of institutions, and some of which require the provision of extra clerical personnel. Quoting from a report of the American College of Surgeons, 1922 (5):

> "How then, can the possession of a complete record be facilitated? Its accomplishment requires the mutual co-operation of the hospital and its staff members."
>
> "The duties of the hospital in this connection, consist, first of all, in supplying adequate personnel to secure the records."

Physicians who are giving their time to clinic work under conditions existing in the average out-patient department today (too many patients, too few physicians, inadequate and poorly arranged equipment, etc.) can scarcely be condemned for not keeping scientific case histories. Trustees should expect their medical staff to keep complete and accurate medical histories only when reasonable assistance in the keeping and filing of records is provided.

CONCLUSIONS.

The study of the literature on the subject of case records and the review of 500 records in ten ophthalmological clinics in New York City justifies the following conclusions:

1. It is important that case records should be carefully

written, filed and indexed, to aid physicians in treating their patients more intelligently, to provide valuable data for reference and research, to give boards of managers and superintendents a valuable guide as to the character and quality of medical service rendered and to assure the benefactors that their money is being helpfully expended.

2. The case records in representative New York ophthalmological clinics are not as a rule satisfactorily written and indexed.

Existing conditions can be improved only through the combined efforts of hospital authorities and clinic physicians. Each clinic should adopt definite standards for content of medical histories. Responsibility should be fixed for the supervision and care of records.

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2. *Modern Hospital*, 1919, xii., 178–180.
3. *Modern Hospital*, September, 1922, p. 227.
4. "New York Dispensaries: Book and Record Keeping," reprinted in *Modern Hospital*, July and August, vol. xv., Nos. 1 and 2.
5. *Modern Hospital*, November, 1922, p. 425.

REPORT OF THE PROCEEDINGS OF THE SECTION ON OPHTHALMOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

By Dr. BEN WITT KEY, Secretary.

MEETING OF NOVEMBER 20, 1922. DR. J. M. WHEELER, CHAIRMAN.

Dr. Martin Cohen reported a case of **amaurotic family idiocy** in an infant of non-Jewish parentage. Appeared in full in preceding issue of the Archives.

Dr. Cohen pointed out the following deductions from the case report. 1st. That unless a fundus examination had been made, the diagnosis may have been overlooked, the patient being non-Jewish. 2nd. Fundus examination is essential in aiding diagnosis in general nervous diseases in all infants. 3rd. Fundus picture is typical, and not to be differentiated. 4th. This case and similar ones change the accepted opinion that infantile amaurotic family idiocy occurs exclusively in children of Jewish parentage.

Discussion: Dr. Bernard Sachs said he had been interested in this disease for the past thirty-five years and was one of the first to present the disease as a clinical entity. He had previously stated that it occurs only in the Jewish race and he has seen many of these cases, perhaps six or seven every year, and only about two weeks before had seen the first case of the disease occurring in a child of non-Jewish parentage.

He did not know why it should manifest itself only in the Jewish race. It represents the most extreme and widespread degeneration of the cellular nervous elements—there does not appear to be a normal ganglion cell throughout the whole nervous system. Only a few cases do not show the typical ocular picture. Sometimes it occurs without the cherry-red spot, but there is atrophy of the optic nerve.

The child usually appears normal up to about a year to four years old, when the degeneration begins—deterioration in every respect, loss of power, listless, the eyes affected at an early date. An interesting and striking fact is that the child is invariably handsome, chubby and in the best of health up to the time the process of degeneration begins.

Some years ago it was believed to be a disease of toxic origin, but there had been much discussion on this point. He is convinced through his experience that it is a widespread degenerative disease of cellular nervous elements. Death occurs in the course of two or three years.

Dr. Herbert W. Wootton had examined the case presented by Dr. Cohen, and confirmed the diagnosis as unquestionably one of amaurotic family idiocy. The disks were atrophic, there was marked œdema of the macula, and a cherry-red spot in the fovea of each eye. The child was listless and unable to support the head. The parents, both of whom were seen, were Italian Christians.

Dr. W. E. Lambert presented a case of **detachment of the retina** on whom he had performed a trephining operation. Patient had a myopia of 18 D. both eyes. Operation was performed June 19, 1922. There was immediate replacement of the retina and restoration of fields and vision, which condition remained until October, 1922, when he found that there had been a re-detachment in the lower inner quadrant. Vision, however, was still $\frac{20}{200}$, but instead of a myopia of 18 D. there existed only 3 D. This rather curious change could be in his opinion only accounted for by the anteroposterior axis of the globe, or a recession of the lens into the vitreous body. When he planned to present this patient before the Section, he was of the idea that at last he had met with success in a trephining operation for detachment, but this case unfortunately turned out to be in line with previous experiences.

Discussion: Dr. Isaac Hartshorne had trephined and aspirated several of these cases with the usual result of immediate recurrence. In one case of minus twenty diopters of myopia trephined within twenty-four hours after detachment came on, the retina stayed replaced for about five months without recurrence. At the end of that time the patient was struck in the eye by a ball, and examination

revealed a re-detachment of the retina. He believes this case would indicate that trephining should be made at the earliest possible moment after detachment.

Dr. E. F. Krug had trephined four cases of detachment of the retina and without any permanent result. One case he trephined four times—after the first trephine there was replacement and vision was very good for two weeks, after second trephine vision returned for five weeks. He believes trephine should be performed and perhaps repeated.

Dr. B. W. Key referred to two cases which he had trephined for detachment; in one case, only temporary replacement resulted; in the second case, young woman, hypermetropic, trephined two days after it occurred replacement remained for three months, and vision (previously $\frac{20}{200}$) restored to $\frac{20}{40}$ gradually became reduced from atrophy and flat detachment of the retina—vision now, 1½ years after operation, is $\frac{20}{100}$.

Dr. L. W. Crigler spoke of a spontaneous reattachment of the retina in a case of myopia.

Dr. H. W. Wootton stated he had seen reattachment of the retina in a case after he had given subconjunctival injections, but he believes it was a spontaneous reattachment and that the injections had nothing to do with it.

Dr. W. E. Lambert in closing the discussion said he believed trephining should be tried because no other measure seems to benefit these cases.

Dr. W. E. Lambert presented a case of **aphakia with glaucoma** in a young girl. In October, 1918, she had a perforating wound of the cornea, with incarceration of the iris, and traumatic cataract. Patient was seen six weeks after the accident. The iris was adherent to cornea and pupillary area full of exudate. Iridectomy was made December, 1918. In February, 1919, a de Wecker was made with excellent result —clear pupil and vision = $\frac{20}{25}$ with plus 8.50 combined with plus 3.50 cyl. axis 45. Patient was under observation and when seen in October, 1921, vision was $\frac{20}{40}$ with correction. When seen in March, 1922, the vision was only light perception, cornea hazy, tension plus. Very poor view of fundus could be obtained but a deep excavation of the nerve could be seen. Patient gave history of frequent attacks of mild inflammation and pain in the eye, which were undoubtedly recurrent attacks

of glaucoma. Hot bathing and pilocarpine was prescribed and eye quieted, but tension remained plus and on March 20th the inner pillar of the coloboma was freed by iridectomy. Patient had an interrupted recovery, but the vision was and still is doubtful light perception.

A case of **exudative retinitis—Coates disease**—was presented by DR. RAYMOND C. DODD. W. S., boy, aged 14 years, September 28, 1922, complained of blurred vision in the right eye, first noticed by him some months before. No history of tuberculosis or lues.

Ocular examination.—Vision of O. D. central scotoma. O. S. $\frac{20}{15}$—pupils equal and active—both direct and consensual. Fundus examination showed an extensive retinitis with scattered whitish atrophic areas of various sizes throughout the periphery of the fundus, and a central area elevated about 2 to 3 D. This mass in the macular region was evenly rounded, of grayish-white color with cholesterin crystals on the surface, its edges were veil-like, over which ran retinal vessels. The tumor appeared like a subretinal cyst. Immediately surrounding the tumor were massive conglomerate atrophic areas. In the extreme periphery of the fundus on the temporal side were noted several small fresh hemorrhages with localized aneurismal dilatations of the small retinal vessels. The vitreous clear. The left fundus was negative.

Laboratory tests were as follows:

Wassermann—negative. Tuberculin—intracutaneous—negative in all dilutions. Urine—negative. Blood count—normal. X-ray of sinuses and teeth,—"There is evidently a mild posterior ethmoiditis with thin septal walls. The teeth are clear."

On October 27th fresh hemorrhages appeared on the summit of the mass and two weeks later another fresh hemorrhage beneath the veil-like nasal edge of the mass.

He believed that in view of the negative tubercular reactions, tuberculosis may be excluded. From the position and appearance he excluded any intraocular new growth. Removal of the tonsils and possibly cleaning out the ethmoids was recommended. This case falls in the group described by Coates—namely a massive exudative retinitis. In favor of this were the extensive white atrophic areas, the

elevated mass, the fresh hemorrhages, the age of the patient and lastly the aneurismal dilatations of some of the retinal vessels. He welcomed any suggestions as to treatment.

DISCUSSION—DR. L. W. CRIGLER called attention to a case of Coates disease which he reported several years before and which was very similar if not the precise picture as that presented by Dr. Dodd's case.

DR. MARTIN COHEN was of the opinion that the primary pathological process in this case was of vascular origin, and also advised the use of miotics in order to prevent in the future a possible secondary glaucoma.

DR. H. W. WOOTTON presented a case of **pemphigus of the conjunctiva** involving both eyes of a boy nine years old. The first symptom was tearing which began in both eyes eight months before. Then blebs formed on the conjunctiva, followed by redness and chemosis. These symptoms lasted about two months when the eyes became dry, the dryness becoming gradually more marked. No purulent discharge at any time. Health otherwise good. No evidence of pemphigus on the skin or in the throat or nose. Status præsens:—Both eyes practically the same. Extensive symblepharon glueing the lids to the globe and restricting all ocular movements. Both corneas involved and very hazy. Vision reduced to shadows in the left eye and fingers at four feet in the right.

DISCUSSION: DR. MARTIN COHEN asked if this may not be a case of essential shrinkage of the conjunctiva rather than pemphigus, because there was no evidence of pemphigus on the skin.

Dr. Wootton replied that he had never seen a case of essential shrinkage of the conjunctiva, and considered it a misnomer; that these are really cases of pemphigus.

DR. ELBERT S. SHERMAN had shown a similar case before the section about twelve years ago. Thought Dr. Wootton's case was interesting because of the very rapid course.

DR. E. WALDSTEIN asked why not attempt total trephine of the cornea and replace by new or transplanted corneal substance, and referred to cases which he had seen presented in Heidelberg; one, a case of old parenchymatous keratitis in which vision was restored, about $\frac{3}{40}$, by such an operation

performed by Elschnig (the normal cornea taken from an eyeball destined for enucleation).

DR. WOOTTON replied that he did not know of any case of this sort that had been successfully operated upon in this country.

A case of **hole in hyaloid membrane** was reported by DR. I. GOLDSTEIN. School boy, aged 19 years, complained of blurred vision in right eye for previous three years. Vision of right eye = $\frac{20}{200}$, of left eye $\frac{20}{20}$. The right eye was the seat of a chorioretinitis, ætiology of which had not been definitely determined. The case was presented to show a circular opacity in the vitreous. Above and to the temporal side of the disk was an almost circular path of chorioretinitis, which was about the same size as the circular opacity. This picture is similar to that described by Sir William Lister as a hole in the so-called hyaloid membrane. It is brought about by a shrinkage of the vitreous in which the membrane between the vitreous and retina is torn around its periphery, leaving the central portion of the membrane attached to the area of chorioretinitis.

A case of **recent hole at the macula** was presented by DR. MARTIN COHEN. S. L., aged 24 years, salesman, four years before was struck in the left eye by a fist. He consulted a physician at the time, and the vision which, following the injury, was $\frac{20}{30}$, remained $\frac{20}{30}$ until two weeks before when the patient was again struck in the left eye by a baseball.

November 20, 1922: Right eye normal. Left eye—vision = fingers at one foot,—large central scotoma corresponding to lesion—lids and ocular conjunctiva ecchymotic, pupil moderately dilated and reacts sluggishly to light. Papilla showed slight temporal pallor,—between the papilla and macula was an old sickle-shaped rupture of the choroid having a yellowish gray appearance, covered by retinal blood-vessels, and bordered and partly covered with pigment. At the macula there appeared some thinly scattered pigment, and in its center a sharply defined, characteristic cherry-red spot about one-half the diameter of the disc.

DR. C. BERENS demonstrated an **accommodation rule; a diplopia glass; a lid everter** and **retractor; and an eye dropper and container.**

The accommodation rule is a modification of the one devised by Prince and modified by Maddox. It resembles the Prince rule in that it may be used for testing the near point of accommodation and has a millimeter scale. It differs from the Maddox rule in that the string is attached from one extremity of the rule, thus permitting the addition of a millimeter scale which may be used separately or in conjunction with the dioptric scale; also the near muscle test is arranged for use at 25*cm.* and the reading is in prism diopters; a stenopaic hole has been added for rapidly determining the improvement of vision, a wide leather case for use as a screen; a protractor for determining the axis of cylinders has been added; and also large and small colored test objects.

The diplopia glass is a plane monochromatic red, toric lens held in a thin metal rim which extends into a metal handle.

The combined lid everter and lid retractor is of two sizes. It is pliable, small and delicately constructed, and can be used for retraction and eversion of the eye-lids for diagnosis, treatment and for operation.

The combined eye dropper and container permits solutions to be used without contamination of contents. It consists of a cylindrical tube three inches in length and three-quarters of an inch in diameter drawn out to a dropper point at one end with a narrow tubular opening at the junction of the upper and middle third to which an eye dropper bulb could be attached.

MEETING OF DECEMBER 18, 1922.

A paper, entitled, **"Case Records in Ophthalmological Clinics,"** was presented by DR. CONRAD BERENS and DR. GERTRUDE E. STURGES.[1]

DISCUSSION: DR. W. E. LAMBERT approved entirely Dr. Berens' views as expressed in his paper, and emphasized the importance of a more careful taking and keeping of records of all clinic and hospital cases.

DR. HOMER SMITH stated that he believed the complete and careful making of case records would be greatly simplified and made certain by requiring the patients to attend the clinic before the regular hour for examination and have a salaried

[1] Published in full in this issue.

non-medical or medical officer, whose duty should be to take a comprehensive history and record the vision of each patient and then classify if possible, and perhaps refract them before the receiving physician sees the patient for study, diagnosis and direction of the treatment of the case. This would save immense amount of time, and give sufficient time for investigation and examination of the more serious complicated cases.

DR. G. W. VANDEGRIFT stated that after all is said and argued on this subject, the answer is found in having paid refractionists for each clinic, so that sufficient time can be given serious medical and surgical cases.

DR. J. W. WHITE felt that the fault is with the attending physicians in not taking the time to record the salient features of a case, both as to history and examination.

DR. JULIUS WOLFF showed a case of **fat implantation nine years after operation.**

Mrs. B. T., in August, 1912, suffered from a very severe case of Basedow's disease with extreme exophthalmos. In the course of a few months the patient was entirely relieved but as the right eye was very disfiguring as result of extensive ulceration and perforation, enucleation with fat implantation was performed in April, 1913. The cosmetic result was such as to make the two eyes look exactly alike when a good artificial eye was worn.

The object in presenting this case was to demonstrate the permanency of the result. There is still present after nine and one-half years a prominent, rounded moveable fatty stump. He was firmly of the conviction, after observing several cases for a number of years, that a well performed fat implantation gives a permanently good cosmetic result. In the case of a boy he implanted too large an amount of fat and waited seven months for it to shrink. Under local anæsthesia he then removed some of the tissue, which, incidentally, was found to have sensation, and obtained a very good and permanent result.

DISCUSSION: DR. B. W. KEY expressed his interest in this case because he had presented before the Section on December 18, 1916, a modification of the fat implantation operation. He had shown before the Section in January, 1919, a boy, aged 9½ years, on whom he had performed the modified fat implantation five and one-half years before, and in which case the

fatty mass remained fully formed, filling the orbit, with very satisfactory motility and presenting a prothesis in similar position and sensitive motion as the fellow-eye. He had also shown a similar case before the Section in December, 1921, to illustrate the same satisfactory feature of this modification of the fat implantation operation. Four similar cases were also presented before the American Congress of Ophthalmology in 1918, when a symposium on "Enucleation and its Substitutes" was the subject of general discussion.

Dr. Key maintained that the fat implantation operation properly performed in suitable cases is the operation of choice.

DR. JULIUS WOLFF showed a case in which he had removed **a cataract containing a foreign body.**

Mr. T. McG., aged 32 years, on September 30, 1922, complained of moderate discomfort of the left eye, and had been told that he had iritis. Absolutely no history of injury of any kind.

Examination showed no evidence of former iritis; eye externally normal, no scar in cornea or elsewhere, pupil round and normal. Lens showed a cataract which had not yet involved the whole cortex but reduced vision to hand movements. In spite of lack of evidence or history of injury the patient was referred for X-ray and a pin point foreign body was located near the posterior surface of the lens in its upper nasal quadrant. On account of the small size of the foreign body and its doubtful nature, an attempt at magnet extraction might not succeed and would necessitate a second operation for its removal. If the lens were needled and washed out and an attempt made to remove the foreign body, the latter might become displaced and fail to be attracted by the magnet. He decided, therefore, to remove the lens together with foreign body. This was accomplished by making an incision a little smaller than usual for senile cataract and removed a large piece of the anterior capsule with the capsule forceps. He delivered the upper two-thirds of the lens unbroken and containing the foreign particle, a tiny iron splinter. Fifteen days after operation vision was $\frac{20}{15}$ with correction.

DISCUSSION: DR. J. M. WHEELER asked if the magnet had been applied, to which Dr. Wolff replied in the negative. Dr.

Wheeler stated that owing to the small size of the foreign body, it may not have responded to the magnet, and that the method of procedure in the case appeared to be an excellent one.

DR. W. E. LAMBERT referred to a case in which he had removed the lens containing a foreign body, without event, and the result excellent.

A case of **traumatic rupture of the choroid** by a shot from an air-gun was reported by DR. C. E. MCDANNALD.

A boy was brought in by his father, who gave the history of the accident and presented in his hand the air-gun bullet which he stated had struck the eye. Examination showed the eye to be ruptured at the nasal portion of the globe, soft, and the anterior chamber partly obscured by blood. The fundus could not be made out. In spite of the clear history, Dr. McDannald insisted upon an X-ray, which revealed a bullet similar to that presented by the father. Dr. McDannald reported the case to emphasize the importance of X-ray regardless of the history.

DR. M. ROSENBAUM showed a case of **connective tissue mass of the optic nerve.**

Boy, M. T., aged 10 years, came to be fitted for glasses. His right eye appeared normal except for a high hyperopia of +12.00 diopters. The fundus of the left eye presented a white mass of connective tissue covering the optic nerve, square in shape, three disk diameters across and about the same vertically. From the center of the white mass a pear-shaped object extended ventrally into the vitreous for about three to four millimeters, the most anterior part having a grayish center. Vision could not be improved and a central scotoma corresponded to the lesion.

DISCUSSION: DR. E. KRUG thought the mass was cystic and probably on a pedicle, seemed curved on either side, certainly fibrous tissue and comes from the optic nerve.

DR. E. M. ALGER recalled seeing two cases very similar, but neither of them was as extensive in outline as the case presented.

DR. MARTIN COHEN thought it might be a case of filaria, similar to a case he had seen described. It appeared to be cystic, and deserved differentiation from echinococcus cyst, filaria and other possible cystic forms that may occur in the eye.

DR. C. E. MCDANNALD had seen a similar mass in the eye of

a pregnant woman, which disappeared after termination of pregnancy.

Dr. E. M. Blake suggested that the high hypermetropia seemed to indicate a congenital defect and perhaps therefore a persistent broad canal of Cloquet.

Dr. B. W. Key presented a case of **unilateral chorio-retinal atrophy.**

M. P., Italian man, aged 30 years, complained of repeated attacks of inflammation of the right eye over a period of fifteen years. Each attack clouded the vision temporarily, each time leaving the eye partly blinded, until now only fingers at two feet could be detected. Left eye normal and free of previous involvement. History and laboratory tests negative. Father of three healthy children.

Examination: Externally both eyes appeared normal. Fundus of right eye showed extensive atrophy of choroid and retina with peculiar pigment distribution, and peri-papillary changes. The left fundus was normal.

Two years afterwards, a violent scleritis, two large and two smaller nodules, developed in the right eye, with the fundus obscured by a dense hyalitis. This was evidently the character of the so-called previous inflammatory attacks of which he complained. The left eye was unaffected. All laboratory tests and other investigation did not disclose the ætiology. Mixed treatment intensive, with local treatment brought relief, and together with subsidence of the scleritis the vitreous became clear and transparent. The chorio-retinal atrophy appeared to be the result of an inflammation of the entire wall of the globe, perhaps affecting the choroid and retina by contiguity rather than directly.

The obscure ætiology, the character of the lesions, and the unilateral feature of selectivity were dwelt upon as being worthy of note.

Discussion: Dr. Martin Cohen suggested that glandular derangement may be the cause, also syphilis could not be ruled out.

Dr. Homer Smith did not regard three healthy children of a parent as any reason for ruling out syphilis of the father, and cited a case in point. He suggested a tuberculin inoculation test.

DR. K. SCKLIVEK said the case was interesting as a case of contiguous inflammation of the choroid; that the atrophic vessels would indicate syphilis.

DR. WALDSTEIN regarded the highly sclerosed vessels as most significant of a previously recurring inflammation.

DR. I. GOLDSTEIN presented a **tonometer tester** (Schiötz). This consisted of eight artificial corneas, similar in shape and curve, as those that accompany the Schiötz tonometer. Through the center of each artificial cornea a hole has been drilled 3*mm* in diameter and 6*mm* in depth. The lower part of the opening has a thread in it. Into this thread a flat-headed screw has been screwed to the desired length, and then set. The artificial corneas are placed into individual openings of a flat piece of steel. For testing, the tonometer is placed in succession upon the different artificial corneas, reading from left to right upon the arc, and are arranged to register 0, 3,5,7,10,15,17, and 20 respectively.

REPORT OF THE TRANSACTIONS OF THE OPHTHALMOLOGICAL SECTION OF THE ROYAL SOCIETY OF MEDICINE.

By Mr. H. DICKINSON, London.

A meeting of the Section was held on Friday, January 12th, the President, Mr. A. L. WHITEHEAD, occupying the chair.

CASES.

Retinitis Pigmentosa sine Pigmento.

Mr. J. A. VALENTINE showed an instance of this condition in a man aged 26, who complained that his sight had been failing since 1915. Vision in the right eye was $\frac{6}{9}$, in the left $\frac{6}{12}$. There was 1 D. of hypermetropia on right and left sides. Ring scotomata were present. The pupillary reactions were normal, and the media clear. The disks showed pallor, and indistinct margins. In order to find his way about at night he had to look closely on the ground, probably due to the contraction of his central visual field.

THE PRESIDENT said that what struck him most about the case was the appearance of the disks. Choroidal changes round the periphery were marked; there was no tendency to the waxy appearance one was accustomed to see, even in the early stages of retinitis pigmentosa.

Amaurotic Family Idiocy.

Mr. A. LEVY showed a baby aged 19 months with this condition. The parents and grandparents were not Jewish, but pure English. The parents were related before marriage; first cousins. The child had a good deal of spastic paralysis,

had the characteristic cry, and had never learned to eat, nor to sit up by itself. The anterior fontanelle was widely open, and the patient had been wasting for some months.

Mr. TREACHER COLLINS reminded members that Sir Frederick Mott had pointed out that the ganglion cells of the whole body, even of the sympathetic system, were affected in this disease.

Maculo-Cerebral Degeneration.

Mr. MONTAGUE HINE brought forward two cases (in brothers) of maculo-cerebral degeneration. He saw the eldest boy three years ago, when he was 16 years of age. He commenced to have epileptic fits when he was 10 years old. These were treated. His vision was then found to be defective, but when he had been fitted with glasses it was still bad. The exhibitor then saw that his maculæ were very finely granular. Dr. Gordon Holmes agreed with the diagnosis of maculo-cerebral degeneration. There was no syphilis, nor consanguinity in the parents. To-day his mentality was seen to be very sluggish, and he had some paralysis, and incontinence of urine.

The patient's brother was brought for an opinion as to whether he had anything wrong with him. Vision was $\frac{6}{12}$ in each eye. Both his maculæ were finely granular. In October he started to have fits; they started at the same age as they had in his brother. The fits had continued at intervals since and this patient seemed to be going the same way as his elder brother just referred to.

Dr. RAYNER BATTEN agreed with the diagnosis, believing that the cases belonged to the juvenile class, not the infantile. In one class pigmentation occurred without cerebral symptoms.

Polycythæmia Rubra, with Visual Defect.

Mr. P. BARDSLEY showed a case of this condition in a young theological student, who was unable to concentrate more than four hours a day, and suffered also from physical fatigue. His red cells numbered 7,600,000 per c.m., and the color index was slightly diminished. During the three years he served in the Army his condition was normal, and he was

classed A1. A physician had told him that venesection to about 30 ozs. every few months was the only real treatment.

Case of Hole in the Hyaloid.

Mr. LINDSAY RAE showed a case of this condition. He said that when he first saw the patient, three years ago, the vitreous was opaque with opacities. Wassermann was strongly positive. After the syphilis had been treated, by injections followed by mercury and iodide of potassium, the vitreous bodies began to clear, and a ring was seen in front of the optic disk. Sir William Lister said he considered it a true case of hole in the hyaloid.

Mr. TREACHER COLLINS said there could be little doubt that in this case the vitreous was torn away from the optic disk, and where that happened there had been left the circular hole which had been described.

Mr. GILBLETT described two cases of the condition he had seen recently at the Ministry of Pensions; in each of those patients the hole was four times the diameter of that in Mr. Rae's case.

Neuro-retinitis with Detachment of Retina.

Mr. RAE also showed a patient with this condition, which had probably been started by a septic focus in the teeth, as that was the only abnormality which could be found. Vision had fallen to $\frac{1}{60}$, but to-day it was $\frac{6}{36}$, and no macular degeneration could be seen. She had been to the seaside for six months, and had had inunction of mercury ointment and the internal administration of iodide of potassium. Vision was, as stated, now $\frac{6}{36}$, and there was an improvement all round.

Mr. HARRISON BUTLER read a paper relating some curious operative results after the operation of cataract extraction.

The Treatment of Conical Cornea.

Mr CHARLES KILLICK (Bradford) read a paper on this subject. He said he believed that keratoconus was not often seen in its earlier stages, but in strenuous work slight cases could easily be overlooked. Where doubt existed there should be a more frequent use of Placido's disk. His own experience

of the condition had been when it presented a definite cone in each eye, when there was an opacity at the apex in one or both eyes, and when the vision was much reduced, usually below $\frac{6}{60}$, though it might be improved to $\frac{6}{24}$ by looking through a small aperture and by adding concave lenses. Sometimes unilateral cases were seen. One such developed suddenly in a lady, and did not vary over a period of several years. Death eventually was due to chronic tuberculosis.

Treatment was almost always a question of surgical interference. Women were by far the more frequent sufferers from it. Of his six last cases, five were in women, including two pairs of sisters and a mental defect. The male was well developed, and had never had good sight. He, and one of the females, had marked peripheral cataractous changes in both lenses. There seemed to be a tendency for it to occur in families. There had seldom been opportunities of microscopically examining eyes with keratoconus, but Parsons stated that Bowman's membrane was intact, but was thinned and wrinkled, Descemet's membrane being unchanged. Parsons gave the following main theories as to causation: Relative increase of intraocular tension; malnutrition of the cornea, or inherent weakness of it; defective embryological development; disease of Descemet's membrane and epithelium. Ulceration or rupture of the cone had not been observed. The cornea was much thinned, and might be reduced to one-third of the normal. The great difficulty was as to how to treat such an obstinate malady.

The late Mr. Charles Wray said that in the early stages much might be done by general treatment, but the treatment laid down by him seemed too rigorous for hospital patients, and required long rest for the eyes. In advanced cases, though general treatment could be added to the surgical, it could not be curative. The mental defect he did not attempt surgery on, and the young man declined it, therefore general treatment had to be carried out, and this resolved itself into the application of a firm pressure bandage and the administration of a tonic. This resulted in restoration of almost complete corneal transparency in a short time. He had seen the same result from it in other cases too. But it did nothing to bring about flattening.

The chief operative methods were cauterization of the cornea, with or without its perforation, combined, if necessary, with optical iridectomy and tattooing, cauterization combined with sclerectomy, excision of the apex of the cone, or by extraction of the lens. He had had only a limited experience of Critchett's target operation. Terrien said that cauterization without perforation had never yielded him good results. He, the author, quoted a case of his own in support of this, that of a nurse, whom he first saw in November, 1920. She was aged 24, and in good health, but her eyes had not been right for the past four years. Vision was bad, and she had well marked conical cornea in both eyes. He did first a sclerectomy in the right eye, to establish hypotony. It was followed by iritis, hypotony and a small macula on the cone apex, which soon disappeared as the eye recovered. The eye healed without leaving any obvious sign of fistulization, and the corneal condition was not altered, nor vision improved. She returned to work, but eight months later came back asking for a further operation, as she could not see to do her work efficiently. The right eye had less than $\frac{6}{60}$ vision, and the left with 7.00—$\frac{6}{36}$. He next tried the effect of performing the first stage of cataract extraction, making a large flap, in the hope that a pressure bandage and post-operative astigmatism might produce a beneficial result, but was again disappointed. Altogether six operations were performed, and later she was admitted to a sanatorium, with her sight very little better.

The following case, however, seemed to show that something better could be done. It was that of a married woman, æt. 49, who had conical cornea, but not so markedly as the last case. Her sight had been gradually failing for twelve years. She had never worn glasses. She had conical cornea in both eyes, with a small opacity on the apex of the right, and there were marked peripheral opacities in both lenses. Vision was less than $\frac{6}{60}$, and was not improved by glasses. General treatment was first tried, but a year later, as there was no improvement and on account of the lenticular opacities, he decided on simple extraction, by the method of the subconjunctival bridge; the width of this bridge should be about one-third of the total incision. A good recovery ensued, and she was discharged after 9 days with a fair amount of after-

cataract. Later she was re-admitted for discission to be carried out, and he succeeded in making an incision in the capsule about *1mm* broad, and *½ cm* long in the vertical diameter. He described the procedure in detail. Vision was found to be improved, and the patient left the hospital in September last with a quite transparent cornea, and was wearing −5.00 D. sphere, together with −1.00 cyl., axis horizontal, with which she could manage to read $\frac{6}{4}$.

Mr. ELMORE BREWERTON described the operation he had carried out in his last six cases of conical cornea, namely, making a crucial incision through the apex of the cone with a narrow Graefe knife, and two lateral incisions with scissors. The wound healed in two or three days, and there was a certain amount of flattening, the patient seeing over the center. One patient, a working girl, on whom he did this, had $\frac{6}{4}$ vision without glasses.

CLINICAL MEETING, FRIDAY, FEBRUARY 9, 1923.

A clinical meeting of the Section was held at the Royal London Ophthalmic Hospital ("Moorfields") on Friday afternoon, February 9th, under the Presidency of Mr. A. L. WHITEHEAD (Leeds), when a large number of cases were exhibited, and a good proportion of them discussed.

Optic Atrophy after Herpes Ophthalmicus.

Mr. LESLIE PATON showed an interesting example of this condition. The patient was a married woman, aged 67. Last Easter she had a bad attack of ophthalmic herpes, which affected all the branches of the first division of the 5th nerve on the left side. There were faint nebulæ on the cornea which were left by corneal vesicles. On recovering from the herpes she found the vision of the left eye was lost. When first seen she could only perceive hand movements with that eye, and the field was evidently very limited. The left pupil did not react to direct stimulus, but did so to consensual stimulus. There was a slight reaction to concentrated light. With the ophthalmoscope an opaque white disk was seen, with fairly clean-cut edges. The lamina cribrosa could not be seen.

There was no evident disturbance of retinal pigment round the edges of the disk, but the vessels were of reduced caliber.

He said true optic neuritis as a complication of herpes ophthalmicus was a comparatively rare event. He had not seen a case with it until last summer, when Mr. Adams, of Oxford, sent him a patient, a lady aged 35, who had had shingles on the right side commencing on May 15th. The whole first division of her fifth nerve was affected. After the subsidence of the herpes in that eye it was found to be quite blind; the pupil was semi-dilated, and was not reacting to light. Her tension, when he saw her, was quite normal. The ophthalmoscope showed an absolutely atrophic disk, and he had yet to hear of even a slight recovery of vision in that eye.

He had found that quite a number of these cases had been published. In Sir Jonathan Hutchinson's classical account in the Ophthalmic Hospital Reports, Vol. v, 9, 191, that authority said that the globe of the eye was never affected except in cases where the naso-ciliary branch of the first division of the fifth was involved, but, though this was a good general guide to prognosis, it was not universally true. In the next volume of the same Reports was a description of a case by Bowman, but this, and some others, were probably not primary infective herpes, but herpes of a secondary nature. Mr. Paton gave a synopsis of a number of other cases.

Evidence of other cranial nerve involvements was much more frequently found. In last year's epidemic he had several cases of diplopia, also one case in which the 6th nerve was involved. Statistics showed that the 3rd nerve was much more frequently involved, there was also affection of the nerve supply to the iris and ciliary muscle in some. It was commoner, in this disease, to find a small than a semidilated pupil. In one very severe and generalized case of herpes now under his care the corneæ were, so far, quite free. Another case had well-marked deep keratitis with iridocyclitis, also cases with hypotony. The latter were mostly those in which the iris and ciliary body were involved in the congestion. Quite recently he saw a case in which the whole of the first division of the fifth and the whole of its second division were affected. The changes in the optic nerve seemed to be

secondary to the peripheral changes in the circulation produced as a result of the herpes.

In regard to any association there might be between this affection and chicken-pox, there was need of further information, but it was accumulating; he had several times been able to trace what appeared to be a causal relation.

Mr. PICKARD (Exeter) spoke of a very severe case of herpes ophthalmicus, resulting in complete blindness. He said it was commonly believed in Devonshire that there was a relationship between herpes and chicken-pox.

Mr. W. H. MCMULLEN described a case of his own now under care in which optic atrophy had followed herpes. There were a few spots of keratitis punctata, probably fairly old, as much of the area was brown, and the disk somewhat pale; it was now white.

Case of Cicatrization of the Retina.

Mr. FRANK JULER showed this condition in a child who was sent from school for examination in the ordinary way because of defective vision, which was $\frac{6}{36}$ in the left eye. The ophthalmoscope revealed a half-circle of fibrous looking material involving the macular region. The tension was plus 2, and there were hemorrhages along the edge of this tissue. Six months previously the eye had been struck by a rubber ball, and the speaker thought the condition was due to trauma; there might have been rupture of the retina and the choroid beneath, and that the hemorrhage from the rupture had now become organized.

Bilateral Tubercle of Choroid in a Kitten.

Mr. J. B. LAWFORD and Mr. HUMPHRY NEAME showed specimens from a kitten which had tubercle of both choroids, with detachment of retina. The kitten had not wasted, nor refused food. It was chiefly fed from the household milk supply. The sight defect developed rapidly, and was known because the kitten walked into a sunken tub of water in the garden. The pupils were dilated and apparently motionless to light; testing by artificial light in a darkened room gave the

same result. The corneas were bright, and the lenses clear After the kitten had been chloroformed out of life, the eyeballs were removed and placed in Zenker's fluid.

Mr. NEAME said he found that the posterior part of the choroid was definitely thickened. The retina was completely detached. There was a small focus of infiltration on one side of the ciliary body. The minute structure was granuloma, in which epithelioid cells predominated. He was unable to find tubercle bacilli in the section, a common experience especially in animals' eyes.

Band Keratitis.

Mr. A. C. HUDSON showed two cases with this condition. The question of interest was the results of operations. In one of the patients he operated by scraping away the film, and the result was very satisfactory, for whereas the sight had been less than $\frac{6}{60}$, it was now $\frac{6}{12}$. The film was not definitely calvareous, but no very definite decision had been come to about it in the laboratory. The vision of the other patient was not so bad as in the one operated upon, but he proposed to do something for her.

Mr. LESLIE PATON agreed as to the toleration of these patients for scraping; as also did Mr. AFFLECK GREEVES.

Atrophic Patches at the Macula, possibly Tuberculous.

Mr. WILLIAMSON-NOBLE showed a married woman, aged 36, who came to hospital giving a long history of operations in various parts of the body for tuberculous disease. Vision in both eyes was reduced to $\frac{6}{60}$, and in the right eye the internal limiting membrane could be seen to be pushed forward 3 D.

Cyst of Sclero-Corneal Margin.

Mr. KENDALL exhibited a boy aged 17, who came on account of feeling a foreign body in the eye, which he regarded as a blister. A cyst of the sclero-corneal margin was discovered. In the ordinary way it was covered by the lid. The boy had no recollection of having received an injury to the eye.

SIR WILLIAM LISTER commented on the similarity of this case to one of implantation cyst following an advancement. In some of these cases there had been an injury in childhood, which had passed as of little account, and that may have been the starting point of the trouble.

A numerous series of cases illustrating changes due to congenital defects and injuries were also examined.

REPORT ON THE PROGRESS OF OPHTHALMOLOGY.

Abstracts by Drs. A. N. Alling, New Haven; M. J. Schoenberg, New York; T. H. Butler, London; P. G. Doyne, London, and K. Wessely (*Archiv für Augenheilkunde*), Würzburg.

Edited by Matthias Lancketon Foster, M.D., F.A.C.S., New Rochelle, N. Y.

I.—THE EYE IN ITS RELATIONS TO GENERAL DISEASE AND POISONS.

1. Alger, E. M. **Three cases of word blindness.** *American Journal of Ophthalmology*, October, 1921.

2. Bell, G. H. **Relation of teeth, tonsils, and intestinal toxæmias to diseases of the eye.** *Journal A.M.A.*, October, 1919.

3. Blake. **Ocular changes in infantile scurvy.** *American Journal of Ophthalmology*, October, 1921.

4. Doyne, P. G. **The scotomata of tobacco amblyopia.** *British Journal of Ophthalmology*, January, 1922.

5. Foster, M. L. **Ocular symptoms of epidemic encephalitis.** *American Journal of Ophthalmology*, January, 1922.

6. Gaudissart, P. **Hypercholesterinæmia and albuminuric retinitis.** *Ibid.*, February, 1922.

7. Harmon, N. B. **Causes and prevention of blindness.** *Ibid.*, November, 1921.

8. Ischreyt. **The involvement of the eye in purpura hæmorrhagica and typhus.** *Klin. Monatsbl. f. Augenheilkunde*, 1921, p. 211.

9. Keegan, J. J. **Neighborhood signs in pituitary tumor.** *American Journal of Ophthalmology*, November, 1921.

10. Patterson, J. A. **Certain appearances observed in the eyeground of the tuberculous.** *Ibid.*, January, 1922.

11. Pincus. **Treatment of methyl alcohol blindness by lumbar puncture.** *Klin. Monatsbl. f. Augenheilkunde*, 1920, p. 695.

12. Schlaepfer. **A case of three days' blindness after aspiratory puncture of the lungs.** *Deutsche Zeitschrift f. Chirurgie*, 1920, p. 132.

13. Schoeppe. **Eye changes in Boeck's lupoid** (so-called benign) **upoid.** *Klin. Monatsbl. f. Augenheilkunde*, 1920, p. 812.

ALGER (1, **Three cases of word blindness**) reports a case of hemiplegia and hemianopsia accompanied by inability to recognize familiar objects. It was with difficulty that the patient found his way about and he could not read. He could, however, write readily but in a few moments could not read what he had written. Two cases of congenital word blindness are also related. Both boys seemed normal except could not learn to read as normal children. Visual memories seem to be stored in the cortex about the angular gyrus on the left side in right-handed persons and the area is divided so that memory for letters, words, musical notes, different languages, etc., has local centers. It is important to recognize these cases that their education may be intelligently directed, for it is possible, in children, to develop the corresponding centers on the other side of the brain. ALLING.

HARMON'S (7, **Causes and prevention of blindness**) paper is largely statistical. He shows that the causes of blindness in infancy are few and therefore the percentages are large. Whereas it is known that 50% of the blindness of infancy is due to ophthalmia neonatorum, the figure for all ages is only 2.5% and for syphilis 9%. Among the preventable causes may be classed ophthalmia neonatorum, phlyctenular keratitis, syphilis, industrial accidents and, to a certain extent, myopia. Trachoma, as the cause of blindness, seems to be negligible in England. ALLING.

In SCHLAEPFER'S (12, **Three days blindness after aspiratory puncture of the lungs**) case the syringe was removed from the needle in order to empty the fluid, leaving the needle open in situ. The patient collapsed immediately, had clonic convulsions of the entire body and moderately dilated pupils which refused to respond to light. Consciousness returned in a few minutes, but the patient could not see. After the fourth day the vision began to return, but it was not fully restored until after six months. The appearance of the fundus was normal on the following day and also for three weeks. He ascribes the symptoms to an embolus of air.

No intelligent ophthalmologist of to-day fails to investigate these causes for eye lesions. BELL'S (2, **Relations of teeth, tonsils, and intestinal toxæmias to diseases of the eye**) paper is a plea for more thorough consideration of focal infections.

The teeth should be properly treated in childhood and future trouble thus avoided. Most tonsils are diseased and should be removed. He thinks that carbohydrates are the cause of gastric and intestinal fermentation and the diet should be as free as possible of sugar, against which he has a special grudge.

ALLING.

BLAKE (3, **Ocular changes in infantile scruvy**) calls attention to exophthalmos in this disease. It has been found in about 10% of the cases and is due to orbital hemorrhage either in the orbital tissue or beneath the periosteum. In the case reported the child recovered when placed upon the proper diet.

ALLING.

FOSTER (5, **Ocular symptoms of epidemic encephalitis**) records with great care the ocular signs which appeared in two of his patients. It is highly important that exact records should be kept, especially regarding the muscular involvements and the sequence of the appearance of the symptoms.

ALLING.

In ISCHREYT'S (8, **Involvement of the eye in purpura hæmorrhagicæ**) first case of purpura hæmorrhagica there were opacities at the posterior pole and little spots in the macula, together with little retinal hemorrhages in one eye. The skin of the lids was strongly pigmented. The second patient had only a small conjunctival hemorrhage, while the third had iritis. Ischreyt also reports a case of double metastatic ophthalmia observed in a case of typhus. The patient was suffering from metastatic abscesses in various parts of his body, and the second eye was attacked about the time that the first was enucleated.

With the introduction of scotometry into the routine of clinical examination it has become necessary to establish and to differentiate various forms of scotomata which are associated with various pathological conditions. In this paper DOYNE (4, **The scotomata of tobacco amblyopia**) is dealing with the scotomata of tobacco amblyopia in this connection. In the first place he states that the tobacco scotomata are situated in the zone between the macula and the blind spot, whereas the early glaucoma scotomata are not usually found in this situation, but rather along the arc of the 10 circle around the fixation point.

With regard to the tobacco scotomata in more detail, he finds that there are 3 types of absolute scotomata:—

(1) A large scotoma involving the blind spot and the area between the blind spot and fixation, but which just stops short of the actual fixation point.

(2) A scotoma lying close to fixation within the 5 circle, connected by a relative area to the blind spot, which may or may not be prolonged towards fixation.

(3) A scotomatous finger pointing from the blind spot towards fixation. These scotomata are absolute scotomata, and associated with them there is relative loss over a larger area. Doyne states the only reliable way of estimating the size of a relative scotomatous area is to reduce the size of the test object, so that the relative area of a large test object becomes the absolute area of the small test object.

With regard to colors, blue conformed with white and red with green.

The red-green absolute loss was much larger than the white-blue loss and usually involved the fixation point, but conformed in shape. Thus, in mild tobacco cases, a red-green scotomatous finger extending from the blind spot towards fixation might be found, when no white-blue scotoma was demonstrable.

A further point touched on in this paper is the phenomenon of successive induction or after images in these cases of tobacco amblyopia. Usually in a well-marked case the after image of red or of green was not obtained, whereas the yellow after image of blue was readily produced.

PINCUS (11, **Treatment of methyl alcohol blindness by lumbar puncture**) reports three cases in which he has tried this method, and says that in all a single lumbar puncture sufficed to secure a restoration of vision to a considerable degree.

Since 1910 several cases of benign miliary lupoid associated with iritis or iridocyclitis have been observed. SCHOEPPE (13, **Eye changes in Boeck's lupoid**) adds another. In addition to the skin the glands and lungs were affected and there were nodules in the conjunctiva, the lids, the tarsus, and the iris, together with cataract, posterior synechiæ, and reduced tension. Wassermann was negative. In the course of time the cutaneous trouble disappeared, but there was no improvement in the condition of the eyes, which underwent phthisis bulbi.

On account of the possibility of such bad complications as were present in this case, the writer believes that the otherwise relative benignity of the disease should not be emphasized in its name.

KEEGAN'S (9, **Neighborhood signs in pituitary tumor**) paper dwells especially on the signs of pituitary tumors, which appear as the result of pressure on the chiasm and the optic nerves. It has been well established that the early extension of these growths is, in the majority of cases, forward in front of the chiasm and that the first ocular signs are contraction of the upper temporal quadrant due to the pressure on the under surface of the chiasm. Further extension forward will result in a more complete temporal hemianopsia and later complete blindness. Other signs are ocular paralysis, anosmia, and exophthalmos due to involvement of the cavernous sinus.

ALLING.

PATTERSON (10, **Certain appearances observed in the eye-ground of the tuberculous**) has observed anomalous distribution, multiplication, and tortuosity of the retinal veins and at times of the arteries as well, in tuberculous patients as in those in whose family history tuberculosis is to be found. He offers no explanation for these abnormalities. ALLING.

The theory that cholesterin in the blood which is deposited in the tissues is responsible for such lesions as xanthelasma, synchisis scintillans, and gerontoxon has been advocated. GAUDISSART (6, **Hypercholesterinæmia and albuminuric retinitis**) instituted a series of experiments to prove the truth of the supposition that cholesterin in excess in the blood produces lipoid deposits in retinitis albuminuria and gives rise to the white spots. He concludes that there is no connection between the two conditions because one half of his cases did not show hypercholesterinæmia and those that did have had also uræmia, high blood pressure, and a number with excess cholesterin did not have retinitis.

II. OCULAR DISEASES, PATHOLOGY, AND REMEDIES.

14. BLATT. **Parenteral injections of milk in trachoma.** *Klin. Monatsbl. f. Augenheilkunde*, November, 1920, p. 668.

15. BRAUNSCHWEIG. **An aid for hemianopics.** *Ibid.*, October, 1920, p. 535.

16. BULSON, A. E. **Butyn, a new synthetic local anesthetic; Report concerning clinical use.** *American Journal of Ophthalmology*, January, 1922.

17. FUCHS, A. **Derivates of the plasma cells in the eye.** *Archiv f. Ophthalmologie*, ciii., p. 228.

18. HESS. **The practically most important tuberculous diseases of the eye.** *Münch. med. Wochenschrift*, 1920, p. 1325.

19. JENDRALSKY. **Radiotherapeutic irradiation of tumors and tuberculosis of the eye and its surroundings.** *Klin. Monatsbl. f. Augenh.*, January, 1920, p. 96.

20. LAUBER. **Treatment of exudative eye diseases with intravenous injections of sugar.** *Wiener klin. Wochenschrift*, 1920, p. 35.

21. SCHWARTE. **Treatment of severe infectious diseases of the eye with injections of milk.** *Klin. Monatsbl. f. Augenheilk.*, November, 1920, p. 678.

22. SIDLER-HUGUENIN. **Eye syphilis in the second generation.** *Ibid.*, January, 1921, p. 44.

HESS (18, **Tuberculous diseases of the eye**) insists that the tuberculous nature of phlyctenulæ is shown by the fact that 95% of the cases present other signs of scrofulosis. He energetically combats treatment of these diseases in the dark, and especially under a bandage. Exposure to the short waved light of the sun has proved beneficial. He sees no advantage to be obtained from the use of calomel, and thinks that the yellow oxide of mercury ointment acts rather as a soothing salve, rather than through any special action of the mercury. Under tuberculous diseases of the uvea attention is called to the frequency with which tuberculous iritis runs its course very inconspicuously, so that it may be easily overlooked, or at least its ætiology not clearly determined.

FUCHS (**17, Derivates of the plasma cells in the eye**) has investigated the eosinophile cells frequently observed by E. Fuchs in iridocyclitis, and describes their form, staining, and occurrence in normal and inflamed tissues of the eye. They show considerable variations in shape, granulation, and staining, but he includes them all under the name plasmacytoid cells and believes them to be partly ripe, partly degenerative forms of plasma cells. They are usually oval or round, but often adapt themselves in form to the surrounding tissue. The nucleus is never lobed, but is roundish oval and has a varying content of chromatin. Its most marked characteristic is a dense granulation of its protoplasm which is accustomed to take bright red

stain in hæmalaun-eosin. But they cannot be called true eosinophile cells because they are strongly basophile with the Giemsa stain. With polychrome methyl blue, or with alcoholic or aqueous solutions of thionin, the granules usually take a red violet stain. They are not colored by acid toluidin blue. In the normal eye they occur most often in the episcleral and subconjunctival tissue. They were very frequent in nine out of thirty cases of severe inflammation, yet they never appeared in intraocular exudates, where plasma cells are accustomed to be very numerous.

SIDLER-HUGUENIN (22, **Eye syphilis in the second generation**) investigated fifty-seven children born of parents who had formerly consulted him on account of eye diseases due to hereditary syphilis, and found only one that showed a positive blood Wassermann. The X-ray revealed no signs of hereditary syphilis in the bones of any. Twelve wives of husbands with hereditary syphilis gave negative Wassermanns, which speaks against the transmissibility of the diseases to the wife. These facts go to show that syphilitic symptoms are not likely to appear in the second generation.

SCHWARTE (21, **Treatment of severe infectious diseases of the eye with injections of milk**) comes to the same conclusion as most observers, that in not a few cases of serious infective processes, such as purulent infiltration of the cornea, infected perforating wounds, and diphtheria of the conjunctiva, marked improvement in the objective condition, and a marked amelioration of the subjective troubles, can be obtained within six to eight hours after the injection, an improvement which could not be expected from other forms of treatment. No benefit was obtained in ulcus serpens.

BLATT (14, **Parenteral injections of milk in trachoma**) obtained no benefit from this method of treatment in trachoma.

BRAUNSCHWEIG (15, **An aid for hemianopics**) places prisms before the eyes with their bases toward the hemianopic side and so obviates to a certain extent the tiring constant turning of the head or the eyes toward the affected side, by displacing the portion of the field in which vision persists across the middle line. Because of the weight of the lenses, the dispersion of the colored rays, and other optical effects, it is not practicable to use prisms stronger than 8°.

JENDRALSKY (19, **Radiotherapeutics of tumors and tuberculous diseases of the eye**) obtained no satisfactory result from irradiation of seven cases of sarcoma of the lids and orbit after thorough operative removal of the growths. With regard to the treatment of carcinoma, his eleven cases showed that superficial tumors may be cured by irradiation without operative intervention, while the deep tumors, involving the cartilage of the lids and the bones, a cure cannot be counted upon with certainty, even after thorough operative removal and subsequent irradiation. When the tumors are not quite superficial they should unquestionably be operated on and the irradiation begun very early. On the other hand inoperable cases may have their subjective troubles much alleviated by irradiation. In spite of the uncertainty of the result, irradiation may be the last resource, when an operation cannot be undertaken without destroying the only eye which has vision.

LAUBER (20, **Treatment of exudative eye diseases with intravenous injections of sugar**) obtained a good result in accelerating the absorption of an intraocular exudate in iridocyclitis and an œdema of the retina in a nephritic neuroretinitis by the intravenous injection of 4*ccm.* of a twenty-five per cent. solution of sugar. The addition of a hypertonic solution of sugar caused no fever and no unpleasant general symptoms. Glycosuria and serious arteriosclerosis are contraindications.

BULSON (16, **Butyn**) records the conclusions drawn from extensive trial of this new drug. It is more powerful than cocaine and acts more rapidly. Its effects are more prolonged and it is less toxic. There is no drying of the cornea, no change in the pupil, and no ischæmic effects. It can be boiled without impairing its efficiency.

III. ANATOMY, PHYSIOLOGY, AND MALFORMATIONS.

23. GRADLE, H. S. **The blind spot.** *Journal A.M.A.*, November 5, 1921.

24. HAGEN. **Secretion of the intraocular fluid in the human eye.** *Klin. Monatsbl. f. Augenheilkunde*, November, 1920.

25. KRAEMER. **Bilateral symmetrical optico-ciliary veins with extension into the choroid.** *Ibid.*, 1920, p. 579.

26. LÖWENSTEIN. **Origin of congenital opacities of the lens.** *Archiv f. Ophthalmologie*, ciii., p. 37.

27. NOVAK. **Malformations.** *Wiener Ophthalm. Ges.*, June 21, 1920.

28. Post, L. **Quantitative determination of cocaine and atropine absorption by aqueous humor.** *Journal A.M.A.*, October 22, 1921.

29. Seefelder. **Hydrophthalmos as a consequence of a developmental anomaly of the angle of the anterior chamber.** *Arch. f. Ophth.*, ciii., p. 1.

30. Siemens. **Ætiology of ectopia lentis et pupillæ.** *Ibid.*, ciii., p. 59.

Gradle (23, **The blind spot**) shows that the blind spot is enlarged in cases of medullated nerve fibers adjacent to the disk, but the enlargement does not correspond in extent to the medullated area as seen by the ophthalmoscope. He explains this on the assumption that the medullary sheath is not opaque to the extent indicated by the ophthalmoscope appearance. The term opaque nerve fibers is a misnomer, the proper term being medullated nerve fibers. Alling.

Kraemer (25, **Bilateral symmetrical optico-ciliary veins**) found in a 4-year old boy with oxycephalus, pale papillæ, and bad vision which could not be measured accurately, within the papilla of each eye a branch of the inferior vein which lost the character of a retinal vein near the margin and suddenly assumed the appearance of a choroidal vessel, and could be followed in the choroid for three papillary diameters, going to the right in one eye, to the left in the other.

In Seefelder's (29, **Hydrophthalmos due to a developmental anomaly**) case there was a considerable enlargement of the anterior segment of the globe, especially of the cornea, with lacerations of Descemet's membrane. A circular peripheral synechia of the root of the iris totally occluded the angle of the anterior chamber. Schlemm's canal was situated far from the open chamber except in the region of a coloboma which was present in the iris. Other anomalies found were an abnormal length of the scleral framework, development of smooth muscle tissue in quite abnormal places, and faulty pigmentation of the posterior pigment layer of the iris. With the exception of the coloboma, the iris was normal.

Siemens (30, **Ætiology of ectopia lentis et pupillæ**) observed a family of ten brothers and sisters, of whom four sisters and one brother had ectopia lentis et pupillæ. From his study of the heredity in this family he concludes that most probably this is a recessive hereditary disease, which is particularly in-

dicated by the frequency of the anomaly among the children while the parents were not affected.

LÖWENSTEIN (26, **Congenital opacities of the lens**) describes two cases of congenital perinuclear opacities of the lens, shaped like a sagittal spindle. In both cases at the head of the spindle, beneath the apparently intact capsule, were dark brown hair lines arranged in a radiating manner, which resembled obliterated blood vessels. He thinks these were connected with the pupillary membrane, of which distinct traces were present in one case, and suggests the possibility that, perhaps in consequence of inflammation, the pupillary membrane penetrated the lens through the capsule.

NOVAK (27, **Malformations**) reports the case of a 10-year old boy who had slight exophthalmos on both sides, ptosis, and lipodermoids as large as peas somewhat encroaching on the cornea on the temporal side in the right eye, on the nasal in the left. Above on each side beneath the conjunctiva were large, lobed, soft tumors of reddish yellow color extending from the outer canthus deep into the orbit. On each side the pupil was ectopic upward with ectropion of the pigment layer. The papillæ were distorted, the course of the blood vessels in the fundus was abnormal, and there was an atrophic spot in the choroid of each eye.

HAGEN (24, **Secretion of the intraocular fluid in the human eye**) says that the human ciliary body can secrete only a fluid poor in albumin and not containing fibrin, while the ciliary body of the rabbit permits the transudation of a fluid rich in albumin and containing fibrin. After removing the aqueous five times from a healthy human eye he has been able to detect by means of the refractometer not the slightest increase in the albumin contained in the aqueous.

POST (28, **Quantitative determination of cocaine and atropine absorption by the aqueous**) withdrew the aqueous of the rabbit's eyes after instillation and subconjunctival injections of cocaine and atropine and estimated the amount of the drugs recovered. He concluded there is little difference in the percentage absorption of cocaine in any strength, that the two methods caused about the same absorption and that, in general, the best method for absorption is by repeated instillation.

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IV. THE SENSE OF SIGHT.

31. FRÖHLICH, F. W. **Studies of periodic after images.** *Zeitschrift f. Sinnesphysiol.*, lii., p. 60.

32. FRÖHLICH, F. W. **Oscillations in the visual field.** *Ibid.*, lii., p. 52.

33. FRÖHLICH, F. W. **Studies of scintillating scotoma in the visual field.** *Niederrhein. ges. f. Natur. u. Heilkunde*, January 17, 1921.

34. JUHASZ. **Complementary colored after images.** *Zeitschr. f. Sinnesphysiol.*, li., p. 233.

35. MENDEL. **Intermittent blindness.** *Neurolog. Zentralbl.*, 1920, p. 503.

36. MÜNZER. **Bilateral hysterical amaurosis.** *Berl. klin. Wochenschrift*, 1920, p. 1094.

37. SCHANZ. **Ultraviolet content of light.** *Arch. f. Ophth.* ciii., p. 158.

38. SCHWARZ. **Bilateral and monolateral blindness; hysterical hallucinations.** *Med. Klinik*, 1920, p. 1252.

FRÖHLICH (31, **Studies of periodic after images**) demonstrated with his apparatus four dark phases during which the sensitiveness to light is reduced in places in the visual field, and suspects that analogous periodic depressions of sensibility may be answerable for the periodic fading of weakly illuminated objects which hitherto has been ascribed to a deception of the senses brought about by changes in the accommodation, or fluctuations in the attention. He thinks that the physiological processes on which periodic after images are based are very closely connected with the processes in the nervous system which underlie periodic reflexes, and that the periodic after image is a periodic specific reflex. It is also said that the periodicity of the after images can be caused only by processes in the central nervous system, for there is no ground upon which to base the idea that it originates in the retina.

FRÖHLICH (32, 33, **Scintillating scotoma in the visual field**) observed on himself the beginnings of a scintillating scotoma and studied the periodicity of the oscillations by means of the same apparatus with which he studied after images. These oscillations differed from the periodic after images in their greater and uniform frequency. The scintillations correspond to the nervous tremor, the frequency being twenty to the second. The duration and strength of the scintillations depended upon the duration and strength of the light stimulus. When the light was of strong intensity and prolonged, or re-

peated several times, the scintillations lasted several seconds, but when the light stimulus was weak they were limited to one or more of the positive after image phases. When the light stimulus was colored the oscillations during the phase of the complementary colored after image had the same complementary color.

JUHASZ (34, **Complementary colored after images**) finds that the time of latency, after which the after image appears, is independent, at least within certain limits of light strength, of the intensity of the original figure, while the distinctness and duration of the after image is dependent upon it. An object on a black background induces a shorter time of latency and a longer duration of the after image than one on a white background. White light therefore accelerates the process which underlies the complementary after image. A corollary of this is that if the brightness of the colorless field against which the after image is observed is changed by the addition of white, the time of latency will be shortened and the after image prolonged, and this the more the whiter the field is made. If the background is darkened, the reverse takes place.

MENDEL (35, **Intermittent blindness**) reports a case of intermittent blindness following a blow on the left temple of a 13-year-old boy. At first vision decreased within five minutes to total blindness, to return within half an hour. Such attacks of blindness were repeated without apparent cause from one to three times a week. Objective examination showed nothing pathological, and there were no signs of hysteria. He believes that the trauma did not cause a direct injury to the brain cortex, but induced a slight condition of exhaustion at this place.

MÜNZER (36, **Bilateral hysterical amaurosis**) reports a case of this nature met with in a soldier 22 years old who, after having been gassed, suffered from conjunctivitis and blepharospasm. After two and a half years in hospital the man entered the school for the war blind. The eyes were kept tightly closed, the upper lids tremulous, and there was hyperalgesia and hypoalgesia in the region of the first branch of the trigeminus. The condition of the eye itself was normal, but the vision was only perception of light. Suggestion, along with strychnine injections, galvanization of the temples and other electrical treatment, effected a restoration of normal vision.

SCHWARZ (38, **Bilateral and monolateral blindness**) reports three cases of typical disturbances of vision, one of bilateral blindness, one of monolateral blindness, and one of hysterical hallucinations in a 10-year-old boy whose vision was good. In the treatment of such conditions as these the main point is to inspire the patients with the belief that the therapeutic measures employed will prove curative. The electric current is very useful for this purpose; strong currents are unnecessary. In obstinate cases hypnosis is of decided advantage. According to Schwarz hysteria is a pure neurodynamic loss of balance between different functional areas of the central nervous system.

SCHANZ (37, **Ultraviolet content of light**) presents the following propositions. 1. The ultrared rays act upon the molecule, increasing the vibrations and raising the temperature, but cannot penetrate the molecule itself; they do not produce chemical changes. 2. The visible rays act chemically upon living substance when they are absorbed through a coloring matter in the cell. 3. The ultraviolet rays of from 400 to 300*mm* act chemically directly upon living substance and can enter the molecule without the intervention of a sensibilitator. 4. Ultraviolet rays from 300*mm* downward likewise enter the molecule and exert a destructive influence upon living tissue, destroying the structure.

V. REFRACTION AND ACCOMMODATION.

39. COMBERG. **Relative binocular correction.** *Arch. f. Augenh.*, lxxxvii., p. 75.

40. ERGELLET. **The effort of accommodation in wearers of glasses.** *Zeitschr. f. ophthalm. Optik*, xix., 6, p. 761.

41. JUNIUS. **The problems of heredity and acquirement of myopia.** *Zeitschrift f. Augenheilkunde*, xliv., p. 262.

42. LEVINSOHN. **Genesis of myopia.** *Berl. ophthalm. Ges.*, October 28, 1920.

With regard to the correction of anisometropia COMBERG (39, **Relative binocular correction**) maintains that in many cases it is necessary that the refraction of both eyes should be accurately corrected, particularly to secure a finer sense of depth.

ERGELLET (40, **The Effort of accommodation in wearers of**

glasses) maintains that the accommodative effort of persons who wear glasses does not correspond to the really needed accommodation, and that from this point of view an eye corrected by a glass is not exactly emmetropic. He shows by figures that the accommodative effort of a myope corrected by a concave glass is distinctly greater, and that of a hypermetrope wearing a convex lens distinctly less than that of an emmetrope.

JUNIUS (41, **The Problems of heredity and acquirement of myopia**) says that neither the theory of the origin of myopia from strenuous near work, nor that of growth under muscular pressure in a special form or orbit, nor that of heredity can be considered satisfactory, though all of them contain much of value. Recently the idea has been expressed that the presence of preëxisting tissue changes must be assumed, which are difficult to differentiate from the secondary changes in the eyeball. But heredity alone does not explain the myopic process. Short-sighted eyes show together with the disturbance of the light sense the well-known thinning of the posterior segment of the sclera, which might be the first recognizable acquired change in the eye based on a hereditary peculiarity. Hereditary and acquired characteristics are always intertwined in myopia. There is no conclusive explanation of the origin of the conus, staphyloma, or of the myopic detachment of the retina. Much goes to show that myopia, with a predisposition in the structure of the eye which is not directly abnormal, is acquired in the true sense of the word, and may, therefore, differ individually. This is of importance for the understanding of individual forms of myopia. The myopic changes thus individually acquired have a hereditary basis. The most recent developments in biology are not opposed to this assumption, which is of fundamental importance. One factor still remains to be mentioned among those that tower above the hereditary factor, the part played by light. The luminous rays may possibly be specially harmful to the cones, while the ultraviolet rays may affect the rods, important in hemeralopia. At any rate it must be remembered that light has a far-reaching sensibilizing effect upon the cells and albumin. The influence of light is not yet susceptible of proof, but an assumption that light has an influence can scarcely be called an untenable hypothesis.

LEVINSOHN (42, **Genesis of myopia**) considers the explanation that myopia is due to a stretching of the eye by the intraocular pressure to be untenable, because a stretching from this cause would take place at the place of least resistance. Such a place would be the anterior segment of the globe in children, the lamina cribrosa in adults. He believes that myopia is caused by the bending forward of the head and body during near work so that the eye falls forward and during convergence pulls upon the optic nerve, which induces a stretching of the posterior segment of the eye. The influence of heredity is not contested.

VI. THE MOTOR APPARATUS OF THE EYE.

43. BIELSCHOWSKY. **Hysterical and functional disturbances of the eye movements.** *Zentralbl. f. d. ges Ophthalm.*, iv., 4.

44. DUANE, A. **The action of the obliques and the bearing of head-tilting in the diagnosis of paralysis.** *Transactions of the American Ophthalmological Society*, 1921.

45. HAATHI AND VUORINEN. **Winking.** *Skandinav. Arch. f. Physiol.*, xxxviii., p. 68.

46. POPPER. **Nystagmus of the lid and incomplete ptosis.** *Zeitschr. f. d. ges Neurol u. Physiol.*, xxxviii., p. 49.

47. SCHWARTZ, F. O. **Tenotomy and looping for the surgical correction of strabismus.** *American Journal of Ophthalmology*, November, 1921.

DUANE (44, **Action of the obliques and the bearing of head-tilting in the diagnosis of paralysis**) maintains that the principal function of the superior and inferior oblique muscles is not torsion but to respectively depress and elevate the eyes and that the inferior and superior recti act in the same manner. Hence it follows that the right eye is turned into the upper right quadrant by the superior rectus and external rectus, the left eye by the inferior oblique and internal rectus with some torsion according to Listing's Law. He says that the conclusion of some authors that a diplopia which is corrected by head-tilting is always due to oblique paralysis is not warranted but that the only real evidence of such paralysis is afforded by development of a marked and increasing deviation of the affected eye in adduction.

HAATHI and VUORINEN (45, **Winking**) find that the frequency of winking varies a great deal, from five to forty

times a minute in normal persons in whom no special influence can be perceived. The variations to be found in one and the same individual are very marked, but within much more narrow limits. Of the factors which demonstrably influence the frequency of winking there may be named such physico-physiological influences acting through the trigeminus and optic nerve as moisture, temperature, currents of air, light, and position of the eye. Psycho-physical influences may increase or decrease the frequency or alter the rhythm; thus close attention causes winking to be less frequent.

According to POPPER (46, **Nystagmus of the lid and incomplete ptosis**) nystagmus-like twitchings of the upper lid may accompany typical ocular nystagmus. He locates the probable site of the cause in the nuclear region of the ocular muscles. Nystagmus of the lid is absent, as a rule, in vestibular nystagmus. The cause may be a diffusion of the stimulation into the nucleus of the levator. The basis for these speculations is an observation made by Popper on a case of multiple sclerosis which presented a right-sided ptosis and a nystagmus that was particularly marked on looking to the left. On looking to the right the ocular nystagmus was present only at times, its place being taken by twitchings of the paralytic lid, while on looking to the left the ocular nystagmus was accompanied by these nystagmic twitchings of the lid which were more distinct in the paralytic lid.

BIELSCHOWSKY (43, **Hysterical and functional disturbances of the eye movements**) divides these disturbances into three groups, the spastic, the paralytic, and the anomalies, which are neither spastic nor paralytic in character. Hysterical nystagmus presents the following characteristics: 1. Neuropathic predisposition. 2. Nystagmus is almost always combined with spasms of the lid, convergence, accommodation, and pupils. 3. The nystagmus is extraordinarily rapid. There is no theoretical doubt concerning its occurrence in hysteria, as it can be produced voluntarily by many persons and can be learned. Paretic symptoms affect only convergence and divergence, hence diplopia is not produced. There are fundamental doubts as to the occurrence of pareses of single eye muscles. A monolateral ptosis can occasionally be produced voluntarily and is therefore possible. It is also known that a

monolateral paresis of the abducens may be simulated to a superficial observation by a combination of a lateral movement of both eyes and convergence. Bielschowsky therefore takes the ground that he cannot recognize a dissociation of eye movements as a hysterical symptom. Finally he describes faults of the fusion mechanism which are not always easy to distinguish from hysterical symptoms in consequence of faulty will impulse. If the fusion apparatus is defective a heterophoria may become manifest through lack of innervation and result in diplopia.

SCHWARTZ (47, **Tenotomy and looping for the surgical correction of strabismus**) describes his operation for advancement as follows: After tenotomy of the opposing muscle the one to be shortened is exposed and split in the middle for a length corresponding to the effect desired. Each half is then pulled away vertically forming a diamond shaped opening. Sutures are then passed horizontally through the conjunctiva and muscle near the extremities of the incision thus drawing the diamond into a vertical line and producing a corresponding shortening of the muscle. Before inserting the sutures and after their final exit through the conjunctiva they are passed through thin perforated gold plates to prevent them pulling through. ALLING.

VII. THE LIDS AND LACRIMAL PASSAGES.

48. COWPER, H. W. **Meibomian seborrhea.** *American Journal of Ophthalmology*, January, 1922.

49. FRIEDE. **A case of pityriasis lichenoides chronica of the lid and conjunctiva.** *Zeitschrift f. Augenheilkunde*, xiv., p. 253.

50. JENDRALSKI. **Radiotherapeutic experiences with tumors and tuberculosis of the eye and its neighborhood.** *Klin. Monatsbl. f. Augenh.*, lxvi., p. 96.

51. KÖLLNER. **Operation for senile ectropion.** *Zeitschr. f. Augenh.*, xlv., p. 14.

52. LÖWENSTEIN. **Cartilage of the ear to stiffen the upper lid after excision of the tarsus.** *Klin. Monatsbl. f. Augenheilkunde*, lxvi., p. 115.

53. SCHNYDER. **Familial occurrence or heredity of diseases of the lacrimal passages.** *Zeitschr. f. Augenheilk.*, xliv., p. 257.

54. SCHWARTZKOPF. **A case of symmetrical tumor formation in all four lids (plasmone) with pathological findings.** *Ibid.*, xlv., p. 142.

FRIEDE (49, **Pityriasis lichenoides chronica of the lid and conjunctiva**) reports a case in which the efflorescences appeared

elsewhere on the body and also on the lids, but not involving the margins and ciliary regions. The conjunctiva tarsi and fornicis showed a uniform dense injection. Later in a recurrence the lid again showed the typical changes in the skin, again leaving the region of the cilia and the edge of the lid free, while in the conjunctiva of the tarsus and of the fornix only a uniform dilatation of the conjunctival vessels with no papilla formation could be made out with the loupe. The onset and disappearance of the conjunctival symptoms along with the exanthem, and its resistance to medicamental treatment, cause the author to think the trouble to be an endogenous infection.

JENDRALSKI (50, **Radiotherapeutic experiences with tumors and tuberculosis of the eye**) is not pleased with the results obtained by irradiation of sarcomata of the lids and orbit. In only one did he obtain a good result, in all the others even intensive irradiation failed to arrest the progress of the growths. Both X-rays and radioactive substances were employed. Two out of eleven cases of carcinoma were pronounced cured; in part of the others the growth was brought to a standstill, or broke down in suppuration. Only very superficial carcinomata of the lid can be cured. Postoperative irradiations should be begun early.

Abnormal secretions of the Meibomian glands are described by COWPER (48, **Meibomian seborrhea**) as thick like cream cheese, thin like oil, and a combination of these which resembles a thin pus. He relates a case in which a grayish white fatty secretion was poured out from the Meibomian glands in sufficient quantity to obscure the vision but accompanied by no inflammatory signs in the lid or conjunctiva. A bacteriological examination showed only the B. xerosis. Treatment gives but temporary relief.

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KÖLLNER (51, **Operation for senile ectropion**) modifies the excision of a wedge shaped piece of the tarsus and conjunctiva in the following way. The first incision is made not in the intermarginal space, but in the skin of the lid just below the cilia, running parallel to the edge of the lid for a distance of five to ten millimeters. At the ends of this incision the intermarginal portion is cut through vertically and the wedge of

tarsus and conjunctiva is excised along with the margin of the lid. The gap is then closed, the intermarginal edge being first accurately approximated and the two sutures introduced joining the edges of tarsus and conjunctiva. To remove the redundant fold of skin the first incision is continued laterally about a centimeter, curving somewhat downward, a triangular piece of skin is excised, the intervening skin is undermined, and the margins of this wound brought together and sutured.

The absence of a firm support in the upper lid after excision of the tarsus in trachoma sometimes results in unpleasant conditions. To obviate these LOWENSTEIN (52, **Cartilage of the ear to stiffen the upper lid after excision of the tarsus**) implants a piece of the helix about *12mm* long by *6mm* broad with its convex surface outward. This piece of helix is inserted between the two layers of the split upper lid, and is not sutured but is held in place only by skin sutures and a bandage. He describes a case in which this operation gave some benefit.

SCHWARTZKOPF (54, **Symmetrical tumor formation in all four lids**) reports the case of a boy 14 years old who had a swelling of the lids that had increased slowly for seven years. He complained of the weight of the lids and a sensation of pressure, but of no pain. There was bilateral ptosis, the lids swollen like air cushions. Palpation showed a firm tissue over which the skin was freely movable. The swelling was greatest in the transition folds. The plica was much enlarged, reaching almost to the lid margin. Diagnosis: amyloid of the conjunctiva. The tumors were partially removed; recovery took a normal course. Microscopically no amyloid could be found; apparently it was only a tissue infiltrated with small cells. All parts of the tissue showed about the same findings. The epithelium was for the most part normal, but in places much thickened. Sharply differentiated beneath it lay a dense accumulation of lymphoid cells, which seemed to consist almost wholly of nuclei that stained strongly with hæmatoxylin. This layer was from 2 to *4mm* thick. The reticulum could scarcely be seen. These were plasma cells. Together with these cells were others like lymphocytes, which the writer considered to be products of the plasma cells. Finely granular cells were scarce, leucocytes nowhere found, and there were no foci of degeneration. There were few vessels, mainly arteries with

well developed muscularis and adventitia, the arterial walls in places undergoing hyaline degeneration. The writer cannot subscribe to Rund's idea of a genetic connection between the connective tissue of the vessels and plasma cells. Section of the left lower lid showed microscopically large roundish cells beneath the epithelium (hyaline form of degeneration of the plasmocytes), cell nuclei mostly marginal, and much plasma with vacuoles. The increase of hyaline degeneration was distinctly demonstrable. Russel's little bodies were marked. The vessels were not increased and were incased in large masses of hyalin. The constituents of the blood were of normal number and form, with an increase of lymphocytes. The benign nature of plasmone is confirmed by the further history of this case.

SCHNYDER (53, **Familial occurrence of lacrimal diseases**) gives two family histories which show heredity of diseases of the lacrimal organs. In three females of one family the onset of the trouble appeared at almost exactly the same age, in the youngest on only one side. Several generations were affected.

(*To be continued.*)

II.—**Text-Book of Ophthalmology.** By Professor E. FUCHS, Vienna. Translated from the XII German edition, revised and enlarged by Dr. ALEXANDER DUANE, New York, VII edition, 997 pages, 445 illustrations. Philadelphia and London, J. B. Lippincott Co., 1923. Price $9.00.

Fuchs' text-book now appears in its seventh English edition which has been entirely rewritten and rearranged. In some of the changes the translator has had the benefit of consultation with Dr. Fuchs and has drawn on the XIII German edition which was completely revised by Salzmann. Many other changes are incorporated by Dr. Duane; thus anatomy is now in a separate chapter, followed by development and physiology; refraction has been remodeled and augmented; numerous changes are made in the chapter on motility, and the sections on light sense, color sense, perimetry, and functional and objective examination are thoroughly brought to date. The parts on special diseases and operations have also been carefully revised and new illustrations added. The book now is an exhaustive, modern treatise, specially intended for the advanced student and specialist. Dr. Duane has placed the English-reading ophthalmologist under a great debt, not only by bringing this classical text-book abreast of the times in which he has preserved the spirit, and often the words, of Dr. Fuchs—but also by adding many personal contributions on subjects on which he is an authority. A. K.

III.—**Brain Abscess, Its Surgical Pathology and Operative Technic.** By Dr. WELLS P. EAGLETON, Newark, N. J. 297 pages with many illustrations. New York, Macmillan Co., 1922.

One of the main symptoms of compression of the brain is papillœdema. While general cerebral compression plays a part in producing changes of the optic nerve-head, the author believes that there are other causes. Papillœdema does not follow cerebral compression unless there is an obstruction of the intracerebral portion of the cerebrospinal fluid circulation. It consequently is absent in abscess of the frontal lobe, and the author thinks that its absence is one of the causes of failure to diagnose an abscess in this location. It frequently, however, develops after evacuation of the abscess in this location. Venous obstruction and an increase in the cerebrospinal fluid system circulation must both be present to develop a true nerve-head swelling. Papillœdema is usually due to an obstructive internal hydrocephalus; a moderate degree is found present in abscess of the cerebellum and of the temperosphenoidal lobe; the intense degree found in tumor never occurs. Papillœdema, according to the author, frequently originates from a blocking of the pathways by which the parenchymatous fluids from the nerve-head and optic nerve are discharged, the blocking being caused by changes in the parenchymatous fluid itself or in the cerebrospinal fluid. The author suggests that the filling of the intravaginal space with a pathological coagulable fluid or alteration of the perineural, pericapillary, or perivascular fluid, is the additional factor generally operative in the production of papillœdema in abscess of the brain. In many localized suppurations, cellular reaction to the toxic influence of an altered cerebrospinal fluid causes a mild papillœdema. Arterial contraction from disturbance of the central sympathetic system in the brain—either from trauma or toxemia—is a factor in some nerve-head changes.

Another important eye symptom is hemianopia in temperosphenoidal lobe abscess. It is due to the association fibers, the cuneo-pulvinar tract being caught between the abscess and the distended ventricle. In the author's experience, the hemianopia is latent in all abscess cases. To detect the frequently transient hemianopia, it is necessary to examine the visual fields repeatedly, both for form and for colors.

The book treats, in turn, general considerations of intracranial surgery, surgical pathology and operative technic of

brain abscess, surgical diagnosis, with appendices on guide to detailed neurological examination, cerebellar abscess with analysis of 125 autopsies, frontal lobe abscess with analysis of 140 reported cases.

The author has made a scientific and an original contribution to this important subject. In addition to a record of personal experience admirably illustrated by original drawings and photographs, the field is adequately covered by a careful study of the recent literature. The author is to be congratulated on the success of the enormous labor expended in this elucidation of a difficult subject which must equally interest the cranial surgeon, the ophthalmologist, and the neurologist. A. K.

IV.—**A Treatise on Glaucoma.** By R. H. ELLIOT, Lieutenant-Colonel I. M. S. (retired), London. II edition, 656 pages with 213 illustrations. London. Hy. Frowde and Hodder & Stoughton, 1922.

The second edition of Colonel Elliot's book on glaucoma has been enlarged and rewritten, and is a welcome addition to our knowledge of this important subject to which the author has contributed so much. The reader will not only receive stimulation but assistance by exact information on many questions and opportunities for research which still remain open in this mysterious condition. The subject has been so well arranged that any point can be readily referred to. Important contributions and views are treated in a clear and analytic fashion and each section is brought to date. The chapter, which to the reviewer stands out, is the one on the diagnosis of glaucoma, a subject the importance of which has not been as fully grasped by the average ophthalmologist as it should be. Colonel Elliot's merit consists in not only having developed the operation of trephining, but in analyzing the symptoms of glaucoma, particularly as regards defects in the visual field which are demonstrated by perimetry with small objects. The book is essential to anyone working in this field. The amount of information, the sound judgment exhibited by the author, and particularly the fluent style of writing, all make it one of the most important contributions to ophthalmology in recent years. A. K.

NOTICES.

Oxford Ophthalmological Congress.

Master, Sydney Stephenson.
Deputy Master, Philip H. Adams.
Hon. Treasurer, Sir Anderson Critchett, Bart., K.C.V.O.
Hon. Secretary, Bernard Cridland, Salisbury House, Wolverhampton.
Past Master, The Late Robert W. Doyne.

February, 1923.

Preliminary Notice.

The Oxford Ophthalmological Congress will assemble at Keble College, Oxford, on the evening of Wednesday, July 4th, next, and the Meeting will be held on Thursday, July 5th, and Friday, July 6th, with an extension to the morning of Saturday, July 7th, according to the length of the program.

On Thursday, July 5th, a discussion on "The Relationship of Dental Sepsis to Diseases of the Eye," will take place, to be opened by W. Lang, Esq., F.R.C.S. (London), and W. R. Ackland, Esq., M.D.S., M.R.C.S., Eng. (Bristol).

Members intending to take part in the Discussion are requested to kindly send in their names to the Hon. Secretary at their early convenience.

The Doyne Memorial Lecture will be delivered on the morning of Friday, July 6th, by H. M. Traquair, Esq., M.D., F.R.C.S.E., the subject being "The Differential Characters of Scotomata and Their Interpretation."

The Official Dinner of the Congress will take place on the evening of Thursday, July 5th, in the Hall of Keble College.

A General Meeting will be held during the Congress at a time of which due notice will be given in the final program.

It is hoped that members will contribute to the success of the Meeting with papers, pathological specimens, new operations, cases or novelties of any kind.

Notification of such at the earliest opportunity to the undersigned will be appreciated.

BERNARD CRIDLAND,
Hon. Secretary.

Salisbury House,
Wolverhampton.

FRENCH OPHTHALMOLOGICAL CONGRESS.

The 36th Congress of the French Ophthalmological Society will take place in Strasbourg, beginning June 11th.

A report on subconjunctival medication will be presented by Dr. Van Lint, of Brussels.

A reduction of 50% will be granted to the members of the Congress by the French railways on account of the holidays in connection with the centenary of Pasteur.

Beginning with Saturday, June 9th, there will be visiting of hospitals, of the Exhibition of Hygiene, excursions to Colmar, in the Vosges Mountains, and to St. Odile.

A detailed program will appear.

For further information address Dr. René Onfray, General Secretary of the French Ophthalmological Society, 6 Avenue de la Motte-Picquet, Paris.